EARTHJUSTICE

December 21, 2018

U.S. Environmental Protection Agency
805 SW Broadway, Suite 500
Portland, OR 97205

Submitted by email to: HarborComments@epa.gov

Re: Comments on Proposed Explanation of Significant Differences for the Portland Harbor Superfund Site

Dear Sirs and Madams:

These comments on the EPA's Explanation of Significant Differences for the Portland Harbor Superfund Site are submitted on behalf of Portland Harbor Cleanup Coalition, Willamette Riverkeeper, Audubon Society of Portland, Portland Harbor Community Advisory Group, and Earthjustice. We object to EPA's proposal to substantially weaken the cleanup remedy at Portland Harbor based on a new study of the cancer risks from a single contaminant.

INTRODUCTION

EPA finally issued the Record of Decision (ROD) for Portland Harbor Superfund Site, 17 years in the making, in January 2017. The proposed Explanation of Significant Differences (ESD) proposes to reduce the area of active mitigation and monitoring for the Portland Harbor superfund site by 17 acres at the request of some Potentially Responsible Parties (PRPs).

We oppose the proposed weakening of the cleanup because it will unnecessarily expose the community to extreme health risks for a much longer period of time. The Portland Harbor site is complex with a toxic stew of contamination from multiple industrial activities over many decades. Benzo(a)pyrene (BaP), a polycyclic aromatic hydrocarbon or PAH, is one such contaminant of concern and was a driver of some dredging required as part of the cleanup. Responding to community and Tribal engagement, EPA increased the amount of dredging at the site. Dredging is the most effective and permanent cleanup action utilized in the cleanup because it removes contamination, makes the fish safe to eat sooner, and reduces the mass of contamination and the potential for recontamination. The proposed ESD would reduce the amount of dredging by 17 acres, shifting the cleanup approach to natural recovery and what EPA terms "institutional controls," such as fish consumption warnings and beach closures. Fish advisories and beach closures are no remedy at all. They leave the most impacted people at risk of harm long after the active cleanup ends. They shift the burden away from those responsible for the contamination to those who eat the fish and use shared natural resources. This is unacceptable.

NORTHWEST OFFICE 705 SECOND AVENUE, SUITE 203 SEATTLE, WA 98104

T: 206.343.7340 F: 206.343.1526 NWOFFICE@EARTHJUSTICE.ORG WWW.EARTHJUSTICE.ORG

EPA is jumping the gun in proposing to make changes to the cleanup standards and remedial plan based on a new estimate of one type of risk from one contaminant of concern. While a new risk assessment has lowered the cancer risk estimate for BaP, EPA is proposing to change cleanup standards for all carcinogenic PAH (cPAHs). It is doing so based on the assumption that the carcinogenicity of the other PAHs should be reduced by the same amount, but this assumption lacks an adequate scientific basis. It also fails to account for the greater toxicity of mixtures of PAHs, as documented in recent studies. In addition, before weakening cleanup standards for areas where carcinogenic PAHs were the driver for the dredging, EPA needs to assess whether noncancer health risks, ecological risks, the risks of recontamination, and the risks posed by mixtures and other contaminants will be greater with a reduced amount of dredging.

EPA should not finalize the Proposed ESD because to do so would abandon the careful balancing that went into selection of a remedy that would result in lower health risks sooner. It should wait to make any changes to the cleanup standards or the remedy until the first five-year review when it will have the benefit of monitoring and experience under the cleanup to evaluate the adequacy of the ROD cleanup standards and time to examine the impact of the new BaP cancer risk estimate on other cPAHs and mixtures. EPA should move forward expeditiously with the cleanup and not prolong exposure to hazardous contamination to save PRPs cleanup costs in contravention of the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund).

BACKGROUND

I. EPA STRUCK A BALANCE IN THE PORTLAND HARBOR RECORD OF DECISION THAT INCREASED THE PROTECTIVENESS OF THE CLEANUP IN RESPONSE TO COMMUNITY AND TRIBAL INPUT.

EPA added the Portland Harbor Superfund Site to the National Priorities List in December 2000 to address hazardous contamination in the Willamette River from historic pollution. The Portland Harbor Superfund site runs about 10 miles down the Willamette River, beginning at the Broadway Bridge by the Pearl District and running north, downstream to Terminal 5, almost where the Willamette meets the Columbia River. EPA, *Record of Decision Portland Harbor Superfund Site*, at 1 (Jan. 3, 2017) (ROD).

Hazardous legacy pollution at the Portland Harbor is an environmental injustice that must be fully remediated—not left in place to poison future generations. Historically, the residential neighborhoods adjacent to the harbor, including North Portland, were predominately African American communities. These communities became the dumping ground for industrial pollution, and the City's first garbage facility. Redlining forced many African Americans into the Albina neighborhood on the east bank of the Willamette River, where they historically fished in the Portland Harbor. Grandparents used to pass on the culture of fishing to their grandchildren, but today hazardous pollution in the Port strips this community of that joy. Although gentrification is changing the demographics of North Portland and the Albina

neighborhood, immigrant communities and communities of color still travel to the harbor to fish for subsistence. *See generally*, Julia Rosen, "A City's Lifeblood," *Oregon Humanities* (Aug. 22, 2017), Attachment A. These communities bear the disproportionate burden of pollution in the harbor, as do the Tribes who relied on the Willamette River for the way of life since time immemorial, and EPA must protect them.

A. The Proposed Remedy Required an Insufficient Amount of Dredging.

After years of foot-dragging and obstructionist behavior by some of the PRPs, EPA finally issued the ROD for the Portland Harbor Superfund Site on January 3, 2017. EPA identified the goals of the cleanup remedy as reducing unacceptable human health risks caused by toxic exposure to contaminated resident fish and shellfish, in-river sediments, surface water, and ground water. EPA also sought to alleviate ecological risks to wildlife and aquatic animals that consume fish, shellfish, and other river dwelling biota. ROD at i.

It took until 2016 for EPA to release its proposed remedy, called preferred alternative, for public comment 16 years after listing Portland Harbor as a Superfund site. EPA described some alternatives as insufficient because they would leave far too much contamination and expose people and the environment to unacceptable risks. As its preferred alternative, EPA identified the weakest option that it believed could possibly pass muster.

In selecting its preferred alternative, EPA considered several remedial tools, with varying degrees of protectiveness. Dredging is the most effective and permanent remediation tool, so cleanups are stronger when greater numbers of acres or feet of riverbank are dredged. EPA also employs another active remediation tool called "enhanced natural recovery," designed to enhance naturally occurring processes by adding a thin-layer of sand over contaminated sediments. For the rest of the contamination, EPA would rely on: (1) monitored natural recovery; and (2) institutional controls. Monitored natural recovery simply monitors naturally occurring processes that, *e.g.*, dilute or move contamination. Institutional controls seek to reduce human exposure by, for example, warning people not to eat the fish or use the beaches. EPA acknowledged that these types of warnings are often ineffective because of lack of clearly understandable warnings, spotty compliance, and an overriding need for sustenance when other options are unavailable. ROD, Part III: Responsiveness Summary at 2-191. In addition, reliance on institutional controls acknowledges that the site will not be safe when cleanup activities end, and places the burden on the victims to adapt their behavior rather than on the polluter. And obviously fish advisories do nothing to reduce exposures to fish, wildlife, and ecological resources.

B. The Community and Tribes Sought Greater Protection From Disproportionate Exposure to Contamination.

The community submitted extensive public comments objecting to EPA's preferred remedy because it was too weak and people would be unable to safely eat the fish for inordinate periods of time. The contaminated fish and shellfish have had and will continue to have a

disproportionate adverse impact on immigrant, African American, Latinx communities, homeless people, and Tribes. The Responsiveness Summary (at 2-192, -225) for the Record of Decision included the following examples:

> People still fish from the water and don't understand the adverse health effects . . . . I would guess that a majority of the people I see are immigrants and need the fish they catch to feed their families.
>
> In the time I spend on the river, I also disproportionately see people of color and low income folks fishing in the Superfund site. They are the ones whose health is most impacted, and social justice demands that we protect everyone who uses the river, especially those who depend on it to supplement their diets.

A study conducted by the Oregon State Department of Health documented evidence of the local transient community bathing in the harbor and fishing for subsistence. Lower Willamette Group Comment Letter, Sep. 6, 2016, ESD Administrative Record, Tab 6; *see also* Portland Harbor Community Coalition Comments (Sep. 6, 2016) (hereinafter, "PHCC ROD Comments"), Attachment B; Rosen, Att. A.

In response, EPA conducted an analysis of environmental justice issues associated with the contamination and the cleanup. ROD, Responsiveness Summary at 2-218 to 2-229. Within the 2.5 mile radius of Portland Harbor, EPA identified a diversity of neighborhoods. It noted that many Tribal and community members fish for recreation or sustenance or because of long-held cultural traditions." *Id.* at 2-191. It further found that people of color living further away recreate in the Portland Harbor area, including "Spanish-speaking, Vietnamese, Hmong, Chinese, Ethiopian, Somali, and Russian/Slavic communities." *Id.* at 2-221.

EPA identified the need to reduce environmental injustices from contaminated fish consumption as a reason to adopt more stringent cleanup standards:

> As a result of public comments like the ones outlined above regarding environmental justice and fish consumption, EPA has chosen a more aggressive cleanup option on the releases of hazardous substances to the Site that will allow for additional fish consumption after construction of the remedy is complete.

ROD, Responsiveness Summary at 2-226. EPA also supported prioritizing areas for cleanup that have high public use.

C. EPA Responded to the Community and Tribes By Making the Remedy More Protective.

In selecting the cleanup remedy, EPA had a legal obligation to ensure the cleanup would protect human health and the environment and comply with all applicable and relevant legal requirements, like state water quality and hazardous substance remedial standards. EPA rejected a few alternatives because they fell short. ROD at 89-96. EPA also had to base its selection of a remedy on a balancing a variety of factors, including CERCLA's strong preference for remedies that will be permanent and effective over the long-term and that will reduce toxicity, mobility, and the volume of contamination through treatment. 40 C.F.R. § 300.430(f)(1)(i).

In the ROD, EPA abandoned its preferred alternative in response to Tribal and community concerns that it would leave too much toxic contamination in the river for far too long. ROD at 85-87. In its place, EPA selected a more protective remedy based on its analysis of the primary balancing factors and its conclusion that protection of human health and the environment and a permanent remedy that would have greater certainty of achieving that protection warranted the cost and length of the cleanup. *Id.* CERCLA's preference for permanent and effective treatment remedies proved pivotal to its ultimate selection of the preferred alternative in the ROD.

First, increasing the amount of the site that would be dredged would increase the long-term effectiveness and permanence of the cleanup. It would also lessen the amount of time it would take to achieve remedial action objectives and increase the certainty that these objectives would ultimately be achieved. And it would lessen reliance on institutional controls, such as fish advisories and restrictions on the allowable use of various properties to prevent or limit exposures.

Second, more dredging would also reduce the toxicity, mobility, and volume of toxic substances. Direct contact with contamination would be reduced sooner, as would the toxic load transported to the Columbia River and Multnomah Channel. The ROD repeatedly highlights the direct correlation between the amount of the site dredged and the permanence and effectiveness of the remedy, as well as sooner reduction of risks and greater certainty of achieving that reduction. "EPA has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and State, Tribe, and community acceptance." ROD at 133.

The ROD increased the amount of dredging, capping, and enhanced natural recovery from 291 acres to 394 acres and from 19,472 to 23,305 linear feet of riverbank. Compared to the proposed remedy, the ROD reduced cancer risks, noncancer risks, and the migration of contaminants of concern through groundwater plumes. While improved over the proposed remedy, the ROD would still leave people and resources at risk for years or even decades after the end of the cleanup operation. These risks will continue because EPA's remedy still relies heavily on monitored natural recovery, fish advisories, and beach closures. EPA determined that adults, children, and mothers with breastfeeding infants would be able to eat more fish safely at

the end of the cleanup, although they still would need to limit how many fish they ate to 16, 14, and 1 fish meal per year, respectively. And those most at risk (such as Tribal members, subsistence fishers, and women who are breastfeeding) would be unable to safely consume more than a minimal amount of the most contaminated fish for an indefinite period of time. The Portland Harbor ROD requires five-year reviews in perpetuity because the selected remedy will leave contamination in place above levels that allow unlimited use and unrestricted exposure, thereby exposing the public to a continued hazardous threat.

II. THE GENESIS OF THE PROPOSED EXPLANATION OF SIGNIFICANT DIFFERENCES

A few weeks after issuance of the ROD, EPA's Integrated Risk Information System (IRIS) released an updated risk assessment for BaP that modified the oral cancer slope factor for BaP from 7.3 to 1 mg/kg-day. EPA IRIS, *Toxicological Review of Benzo[a]pyrene*, (Jan. 2017). Some of the PRPs seized upon this study to lobby EPA to weaken the cleanup remedy.

Specifically, on August 2, 2017, NW Natural, a gas company and one of the PRPs, sent EPA a letter, urging EPA to make dramatic changes to the sediment cleanup levels throughout the Portland Harbor site. NW Natural argued that all cleanup standards based on carcinogenic PAHs should be weakened because of the updated risk assessment for BaP. NW Natural assumed that the IRIS study could be applied in a formulaic manner to all triggers for remediation based on cPAHs and argued for lowering all sediment and riverbank soil cleanup levels for cPAHs and reducing the number of acres of contaminated sediment removed by dredging. *See* Proposed ESD, App. A4, Tab 10.[1]

EPA made the NW Natural advocacy documents available to the Tribes whose Treaty rights are adversely impacted by the contamination of Portland Harbor and who are natural resource damages co-trustees. The Tribes pushed back against NW Natural's wholesale application of the IRIS study to all cPAH triggers and to NW Natural's methodology underlying its quest for lower remedial action levels. First, the Tribes opposed any change to navigation channel cleanup levels because other cleanup standards, *e.g.*, for benthic risks, are unaffected by the IRIS study and are more protective. Proposed ESD, App. A8, A11. Second, EPA could not reduce protections below that required by state and federal water quality and hazard remediation standards. *Id*. Third, NW Natural deviated from EPA's methodology and offered its own novel approach in arguing that the remedial action levels for the nearshore area and navigation channel should be weakened. *Id*. Fourth, if the cPAH cleanup standards are weakened, EPA would need to determine whether other contaminants of concern should be the drivers for cleaning up specific areas where cPAHs had previously been the driver. Proposed ESD, App. A11. In

[1] The ESD administrative record contains a critical response from Tribes to a proposal by the Port of Portland to weaken cleanup standards at Terminal 4. Proposed ESD, App. A9. However, no Port proposal is in the record. Nor is there an EPA analysis of any such proposal. If the Port's proposal played any role in the development or contents of the ESD, it should be made publicly available for review and comment, along with EPA's analysis of it.

addition to their concerns about these technical issues and about the hasty, PRP-driven process by which EPA was considering these changes, the Tribes insisted that EPA not delay the cleanup and that it conduct an in-depth evaluation to ensure that any changes will not reduce health and ecological protections. Proposed ESD, App. A8, A11.

NW Natural continued to press aggressively for its proposed changes to the ROD. EPA resisted the pressure to weaken navigation channel standards because a weaker standard for carcinogenic PAHs would not be protective of ecological risks, but decided to weaken the other standards. Proposed ESD, App. A3 at 5 (in response to NW Natural memorandum, stating that the information warranted changes to the cleanup levels for cPAHs, principal threat waste, and nearshore sediment risk action levels). All of the PRP advocacy and EPA's responses took place behind closed doors for more than a year before EPA revealed its plans to the public. By then, EPA had decided to make most of the requested changes to the ROD.

The public revelation came on October 22, 2018, when EPA released its Proposed Explanation of Significant Differences. EPA described the pathways of exposure to cPAHs as including beach exposure by dockside workers, transients, recreational beach users, and high frequency fishers, direct exposure to contaminated sediments, and consumption of contaminated shellfish, including clams and fish. Proposed ESD at 21. EPA proposed weakening cleanup levels for cPAHs by the reduction in cancer risk identified in the IRIS risk assessment. Proposed ESD at 20. These and other proposed changes would weaken the cleanup levels for recreational beach sediment, direct contact with sediments in near-shore areas, shellfish consumption, and the threshold for highly toxic principal threat waste. *See* Proposed ESD at 27-28, Table 1. EPA also proposed weakening the remedial action level for sediments outside the navigation channel threefold.[2]

The weaker cleanup standards would reduce the amount of active remediation in this Superfund cleanup. The ESD would reduce the area dredged and capped by 17 acres and the riverbank remediation by 713 feet. Proposed ESD at 25, Table 8. Seven percent less of the groundwater plume would be remediated. Proposed ESD, Table 7. At the end of the cleanup, the ESD would allow greater risks to remain in surface water, clams and other benthic organisms, and additional ecological endpoints. Proposed ESD, Tables 4, 5, 6. In terms of human health, the changes would increase hazardous risks from consuming fish and shellfish from the harbor, particularly in pollution hotspots. Proposed ESD, Figs. 10a to 10l, Table 3. The proposed changes would reduce the cost of the Portland Harbor Superfund cleanup by $35 million. Proposed ESD at 9.

[2] EPA identified a mathematical error in its calculation of carcinogenic PAHs shellfish consumption sediment cleanup level for subsistence fisher risks. The Proposed ESD would correct this error, but that correction is the type that is appropriate for an errata. The undersigned agree that the mathematical error should be corrected.

EPA SHOULD NOT FINALIZE THE PROPOSED ESD.

These comments address policy, legal, and technical deficiencies in the proposed ESD. The technical comments are based on a review conducted by Dr. Peter de Fur, a scientist and technical advisor to citizen organizations concerning the cleanup of contaminated sites at CERCLA and RCRA sites around the country, as well as EPA. Curriculum Vitae of Peter Lee deFur, Ph.D., Attachment C. EPA led a closed process to develop the ESD and ROD implementation activities. EPA has failed to abide by best practices concerning transparency and public participation. Public comments from other groups raise these concerns and offer recommendations and demands for a more open and inclusive process going forward, sentiments that the undersigned share.

I. EPA SHOULD NOT WEAKEN A CLEANUP PLAN THAT ALREADY LEFT PEOPLE EXPOSED TO UNACCEPTABLE HEALTH RISKS LONG AFTER THE END OF THE CLEANUP ACTIVITIES.

The ROD strengthened the remedy in response to community and Tribal input and the mandated balancing of the statutory remedy selection criteria, and EPA cannot abandon the balance it struck as is envisioned in the proposed ESD. While the PRPs lobbying for the weaker cleanup standards may be motivated by desired cost-savings, EPA must adopt a cleanup under CERCLA that is responsive to the public and protective of public health. To be true to the public input and community engagement, and the multi-faceted remedy selection balancing EPA undertook as mandated under Superfund, EPA cannot now unravel that plan by elevating cost savings over public health. It must heed Superfund's preference for permanent and effective remedies that limit the length of time it will take to achieve cleanup levels. In adopting the ROD and strengthening the cleanup standards compared to EPA's proposed remedy, EPA weighed all the factors that go into selecting a remedy and modified the proposed remedy to be more responsive to community and Tribal demands for greater protection of health and the environment.

The Proposed ESD departs from that type of multi-faceted decision-making process that integrates all of the statutory remedy selection factors. It elevates the PRP's concerns over public health and the environment, and it undoes the careful balance struck as a result of community and Tribal engagement through the public participation process compelled by Superfund.

EPA cannot unravel the Portland Harbor ROD through the backdoor based on a risk assessment on a single chemical. Doing so would render irrelevant the thousands of public comments on the original proposed plan that urged EPA to use the more stringent and protective remediation method –dredging – throughout a greater portion of the Portland Harbor Superfund Site. *See* "National Oil and Hazardous Substances Pollution Contingency Plan", 55 FR 8666, at 8772 (Mar. 8, 1990) ("The public comment on the original proposed plan required under section 117(a) could be rendered meaningless by a revision which is fundamentally different from the remedies suggested in the proposed or final remedial plan."). By EPA's own account, these

public comments spurred the agency to increase the acreage of the harbor remediated by dredging. ROD at i-ii.

EPA cannot simply plug the IRIS cancer risk estimates into the cleanup levels and remedial action levels in a rote manner. It must consider how doing so will impact the near-term risks to the public, the long-term effectiveness and permanence of the cleanup, the reduction and certainty of the reduction in health and environmental harm, and other statutory criteria.

The weakening of the cleanup standards and remedial action levels would have palpable effects. Most importantly, it would reduce the amount of active remediation through dredging. The proposed weakening of the remedial action level for sediments outside the navigation channel would reduce the area that would be dredged by 17 acres. Proposed ESD at 16. It would also shrink the area subject to contaminated riverbank remediation by 713 feet, as compared with the ROD. Proposed ESD at Table 8.

This reduction has over-riding significance since the amount of dredging has a direct correlation to the decrease in cancer and other risks, the permanence and effectiveness of the remedy, the certainty that the cleanup will reduce the risks, and reduction in the toxicity, volumes and mobility of the contamination. EPA relied on the benefits of dredging in selecting the ROD remedy over a weaker one it had previously preferred. Now it is backtracking, and that backtracking increases and prolongs health and ecological risks.

A. <u>The Proposed ESD Would Increase Cancer Risks.</u>

In the ROD and its prior assessments of cancer risks, EPA adhered to its standard approach, which establishes a goal of protecting against any greater incidence of additional lifetime cancers than one in 1,000,000 (expressed in the scientific notation 1×10^{-6}). That is the level of protection EPA uses to establish cleanup levels – the residual concentrations of contaminants deemed protective under specified exposure conditions. One in a million additional lifetime cancers is widely recognized as an accepted level of protection. EPA uses it to prohibit regulatory actions that expose the public to higher cancer risks. H.R. Rep. 104-669 Part 2, Food Quality Protection Act of 1996, 104th Cong., 2d Sess. 41 (1996) (for risks such as cancer that can be assessed through quantitative risk assessment, Congress intends for EPA to continue to interpret "a negligible risk to be a one-in-a-million lifetime risk").

Under Superfund, EPA has allowed states to set a lower level of protection, provided it allow no more than 1 additional lifetime cancer in 10,000 exposed. Oregon requires hazardous waste remedial actions to protect against an additional lifetime cancer in 100,000 exposed (1×10^{-5}). OAR 122-0115.

Both the ROD and the preferred alternative came perilously close to the 1×10^{-4} cancer risk level for the sediment and fish consumption remedial action objectives. Even purporting to protect against 1×10^{-5}, at the end of the cleanup, the selected remedy would allow adults to eat no more than 16 fish meals per year, children 14 fish meals, and mothers with breastfeeding

infants, only 1 meal. And the ROD indicates that fish advisories would be required because it would be unsafe to consume greater amounts of fish for a long period of time after the end of the cleanup.

By endorsing a reduction in the amount of dredging, the ESD would allow cancer risks to butt up against the 1×10^{-4} level at many locations in the Portland Harbor site. ESD at 28-29; Table 3. At some locations, EPA projects that the ESD would increase cancer risk from fish consumption of 27%, 35%, 39%, and even 100% (compared to the ROD).[3]

In the ROD, EPA provided a comparison of the various alternatives that laid out how many fish meals people would be allowed to consume safely at the end of the cleanup. The number of fish meals is shockingly small, confirming that the adopted cleanup would continue to expose people to unacceptable risks if they ate even two fish per month. The ESD provides no estimates of how many fish people would be able to eat under the weakened cleanup or how long restrictions on the amount of fish that can be safely consumed would continue after the end of the cleanup. It should be remembered that when the ROD selected a more protective remedy than what it had proposed, the amount of fish that could be safely consumed went up only incrementally (2-3 fish meals per year for children and adults and 0.3 fish meals for breastfeeding infants). Other alternatives would have doubled the allowable fish consumption. ROD Table 22. Given Superfund's over-riding mandate to protect human health, one would expect EPA to have considered and presented to the public the real-live effects of changing the remedy under the proposed ESD.

Finally, the proposed ESD would violate the mandatory Superfund requirement that all applicable or relevant and appropriate requirements ("ARARs") must be met after the cleanup. Oregon law sets a lifetime cancer risk limit of 1 in 100,000 (1×10^{-5}). OAR 340-122-0115. In the ROD and proposed ESD, EPA identifies the one in 100,000 risk level as an ARAR for the Portland Harbor site. The ROD would allow cancer risks far greater than this limit on the assumption that natural recovery would reduce them to the limit over an unspecified period of time. When and even whether cancer risks would be reduced under the ROD to the ARAR level was far from certain.

Now EPA is proposing to slip further by allowing cancer risks ten times greater than what Oregon law allows at the end of the cleanup. At river mile 6.5, cancer risks would increase

[3] The ESD provides two types of estimates of changes in cancer risks. The first is a formulaic application of the cancer slope factor from the IRIS risk assessment. Application of this formula unsurprisingly leads to lower projections of cancer risks, even if nothing changes in the cleanup remedy. The second is an estimate of the risks that will be presented at the end of a weakened cleanup. These changes have real-life consequences on people and the river and would increase under the proposed ESD.

by 93%. At river mile 5.5, cancer risks would worsen from 9 x 10^{-5} to 1 x 10^{-4}, from meeting the Oregon limit to an order of magnitude greater than what Oregon law allows. ESD Table 3.[4]

B. The Proposed ESD Would Increase Non-Cancer Health Risks.

In the proposed ESD, EPA reveals other increased health risks as an outcome of the proposed changes. In addition to cancer, BaP is linked to neurological, developmental, reproductive, and immune toxicity in people. EPA never offers a justification for increasing risks when it would unravel the hard bargain struck in the ROD in response to community and Tribal demands to increase protection.

EPA assessed the risks of health effects other than cancer using a different, standard methodology. EPA compared the average daily exposure to its safe level, called a reference dose. EPA derives a hazard quotient, which is the ratio of the exposure to the reference dose. Hazard quotients that exceed 1 are of concern. ROD at 37. The ROD identified the most serious risks as from the consumption of fish and shellfish with subsistence fishers and their breastfeeding infants facing the highest risks. ROD at 39-42; *see also* ROD Table 11a in Appendix II) (additional lifetime cancer risks to children as great as 2 in 100 and for nursing infants 1 in 100).[5]

The ESD projects that noncancer risks would increase by substantial percentages for children and infants. For example, the hazard index for a child would increase from 0.8 to 1.7, turning what was not a risk of concern to one that is now of concern. ESD at 29. The hazard index for an infant at river mile 6.5 would increase from 25 to 48, a 91% increase. *Id*., Table 3.

EPA appears to have discounted these increased risks by averaging them over the entire site, but the risks from the highly contaminated Gasco and Terminal 4 sites have been the subject of heightened concerns because of their high levels of contamination from PAHs. Cutting corners on dredging of principal threat wastes at these sites would leave dangerous hot spots, as Table 3 reveals. Given EPA's mandate to protect public health, it cannot justify the increases in health risks to children at river miles 5.5 to 6.5 by 24%, 43%, and 100%, or to infants by 23%, 38%, and 91%. Shrinking the area that would be dredged at these highly contaminated sites would also lead to the migration of the contaminants that would pose risks to people and the river far into the future. This is a particular concern at the Gasco site because it is subject to scouring, which mobilizes sediments allowing them to move downriver. By using the IRIS

[4]The ROD indicated that some risks, *e.g.*, from PCBs, would be greater than allowed under the ARARs due to background contamination. That is not the case for PAHs, and the ESD Table 3 indicating that the ROD would reduce contamination more than the proposed ESD makes it clear contamination remaining at the end of cleanup is not due to background levels.

[5] The Agency for Toxic Substances and Disease Registry toxicological profile for PAHs also identifies reproductive impairments, birth defects, lower body weight in infants, adverse effects on the skin and body fluids, and impaired immunities, available at: https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=122&tid=25.

cancer risk level to weaken the standard, EPA is focusing only on the high toxicity of PAHs, but principal threat wastes include contaminants that are highly mobile. EPA needs to consider whether PAHs should still be designated as principal threat wastes based on their high mobility at least at PAH hot spots like Gasco that are subject to scouring.

C. The Proposed ESD Would Increase Environmental Risks.

The IRIS cancer risk assessment – the articulated basis for the proposed ESA – has no bearing on ecological risks. EPA recognized this when NW Natural asked it to weaken the cleanup standards for the entire site. EPA appropriately refused to do so because the standards based on environmental risks are stronger than a weakened health-based standard downgraded based on the IRIS cancer risk level.

EPA included in the proposed ESD information indicating that weakening the cPAH standards would worsen environmental risks at the end of the cleanup. Specifically, the proposed ESD would reduce the area of contaminated groundwater plume remediated by 7%. Proposed ESD at 29; Table 7 (down to 32% from 39%). The groundwater plume is a mechanism by which hot spot contamination can move through the site and downstream, causing recontamination and spreading the concentrated pollution to other places and media.

The proposed ESD would reduce the ability of the cleanup to attain surface water remedial action objectives, not only for cPAHs, but also for other contaminants of concern like arsenic, chlordanes, BEHP, a phthalate, and DDE and DDD, metabolites of DDT. Proposed ESD at 25, 29 & Table 6. This is particularly troubling because the ROD would leave concentrations of many contaminants in surface water at concentrations ten times greater than the cleanup levels for human health and fish and other aquatic life. It would take longer to achieve the cleanup levels through natural recovery processes. In its community information session on the ESD on November 20, 2018, EPA admits, "[n]atural recovery processes such as sediment deposition within the navigation channel are not happening for contaminated areas between RM 5-7." EPA Region 10, Community Information Session, Proposed Explanation of Significant Differences (ESD), Portland Harbor Superfund Site, Sean Sheldrake and Laura Knudsen (Nov. 20, 2018), Attachment D, https://semspub.epa.gov/work/10/100122434.pdf.

The proposed ESD is indefensible in how it addresses risks to benthic organisms, the creatures like clams and crayfish that live in the riverbed. The ROD established a total PAH sediment cleanup level for benthic risks of 23,000 µg/kg. The proposed ESD would increase the total PAH human health RAL from 13,000 µg/kg to 30,000 µg/kg. In other words, EPA would no longer require dredging that would be necessary to meet the benthic risk cleanup level. EPA admits that "PAHs in sediment present unacceptable risk to the benthic community." Proposed ESD at 25. It nonetheless tries to justify the proposed ESD by asserting that its effect on the ability to achieve the benthic risk remedial action objective or cleanup levels would be "minimal." *Id*. EPA admits, "the total PAH cleanup level of 23,000 µg/kg is exceeded in the navigation channel between RM 5 – 7 with unacceptable risk to the benthic community." EPA Community Information Session, at 19.

The ROD assessed the extent to which the alternatives would reduce benthic risks to 10 times more than what would be allowed under the cleanup standards in the long run, on the assumption that natural recovery would lead to attainment of the cleanup standards. The proposed ESD would result in a smaller percentage of the site meeting both the remedial action objective and the cleanup standard. Proposed ESD at 25, 29 & Table 4 (3% and 2% respectively). What EPA calls a "minimal" effect is moving in exactly the wrong direction and without any justification based on any asserted change in the science or data from the site.

Weakening the Superfund cleanup remedy should be subject to a heightened level of review given the focus of CERCLA on protecting public health and the environment. *Burlington N. & Santa Fe Ry. Co. v. United States*, 556 U.S. 599, 602 (2009); *Dedham Water Co. v. Cumberland Farms Dairy*, Inc., 805 F.2d 1074, 1081 (1st Cir. 1986) ("CERCLA is essentially a remedial statute designed by Congress to protect and preserve public health and the environment. We are therefore obligated to construe its provisions liberally to avoid frustration of the beneficial legislative purposes.").[6]

D. The Proposed ESD Would Disproportionately Impact Subsistence Fishers From Low-Income Communities and Communities of Color.

In adopting the ROD, EPA recognized that Portland Harbor contamination disproportionately impacts low-income people and communities of color. Even though the proposed ESD would take a sharp turn away from the ROD and weaken the cleanup standards, EPA has not even acknowledged the environmental injustices that would result from adopting it.

By reducing the scope of the cleanup plan, the proposed ESD would increase health risks from consuming contaminated fish and shellfish. As EPA recognized in adopting the ROD, communities of color and low-income people, including historically disenfranchised and marginalized populations, disproportionately rely on fishing from the lower Willamette River for their subsistence. This phenomenon is not uncommon. Communities of color, low-income communities, and Tribes consume fish in greater quantities and rely on fish for cultural, traditional and subsistence reasons more than the general population. Nat'l Envtl. National Environmental Justice Advisory Council, Fish Consumption and Environmental Justice at 14 (Nov.: A Report Developed from the National Environmental Justice Advisory Council Meeting of December 3–6, 2001 (revised November 2002) ("NEJAC Report"), https://www.epa.gov/sites/production/files/2015-02/documents/fish-consump-report_1102.pdf.")

[6] Because the proposed changes would unravel the balance struck by EPA when it considered and balanced the CERCLA remedy selection factors, and alter the remediation plan in a way that exposes the community to higher health risks for much longer, these changes may be too great to make through an ESD. *See* 40 C.F.R. § 300.435(c)(2)(i)-(ii) (fundamental changes to cleanup remediation must occur through a ROD amendment, not an ESD); *United States v. Burlington Northern R. Co.*, 200 F.3d 679 (10th Cir. 2008) (EPA had to amend the ROD to fundamentally change the cleanup plan).

at 14. EPA should not scale back the scope of the cleanup plan without appropriately accounting for and addressing the exposure of members of communities of color, low-income communities, and Tribes.

To the extent that EPA reduces the amount of dredging at Portland Harbor, it would inevitably increase its reliance on fish advisories, which shifts the burden from the polluter to the people exposed to the health risks, contrary to Superfund's polluter pays principle. Such risk avoidance strategies ask impacted communities to "refrain from eating the fish, drinking the water, playing at the field down the hill, working outdoors, and undertaking a host of other heretofore ordinary, healthful, and even cherished human activities[.]" Catherine O'Neill, "No Mud Pies: Risk Avoidance as Risk Regulation," 31 Vt. L. Rev. 273, 274-275 (2006). EPA has acknowledged that, "a fish advisory and posting warning signs may not be sufficient by themselves to adequately inform the public about risks at the Site." Responsiveness Summary Report at 2-191. Studies have found that people of color, people with low incomes, limited English proficiency, or relatively little education are less likely to be aware of fish consumption advisories. NEJAC Report at 107.

Relying on fish advisories is particularly misplaced when environmental justice communities are involved, as studies have shown that "it may be impractical or impossible for those who are affected by contaminated aquatic environments to give up or alter their fish consumption practices. This may be so for economic, geographic, historical, traditional, cultural, religious, and/or legal reasons." As the National Environmental Justice Advisory Council recommended in its Fish Consumption and Environmental Justice Report, "EPA needs to refrain from falling back on 'institutional controls' (*e.g.*, put a fence around the site and post 'No Fishing' signs) and undertake aggressive cleanups where the sites are past or present locations for fishing and other activities that expose communities of color, low-income communities, tribes, and other indigenous peoples to contamination." NEJAC Report at 89. The proposed ESD ignores NEJAC's advice. By opting for a less aggressive cleanup, EPA's proposed ESD may further exasperate the nutritional deficits and other health detriments that disproportionately affects environmental justice communities. The proposed ESD should be rejected and EPA should leave the original more aggressive cleanup in place.

II. EPA LACKS AN ADEQUATE SCIENTIFIC BASIS FOR WEAKENING THE CLEANUP.

In its haste to make the changes to the ROD sought by PRPs, EPA is proposing to weaken the cleanup without fully investigating and understanding the implications for health, the environment, and impacted communities. EPA should keep the cleanup on track and avoid weakening the cleanup and exposing people to risks and fish advisories for longer periods of time than would occur under the ROD.

A. The IRIS Risk Assessment on BaP is an Insufficient Basis to Weaken the Cleanup Standards.

The Proposed ESD would change cleanup standards based on the IRIS update that lowered the cancer potency of BaP. IRIS only evaluated the carcinogenicity of BaP and not other PAHs. Even as to cancer risks, IRIS addressed only some risks. While IRIS classified BaP as a carcinogen to humans by all routes of exposures, it did not quantify the risk of skin cancer from dermal exposures, even though the draft assessment had done so. Industry trade associations had urged IRIS to abandon the quantitative skin cancer assessment.

Nor did IRIS review the relevant potency of BaP and the other carcinogenic PAHs. In the ROD, EPA compared the six other carcinogenic PAHs to BaP, using a formula that assigned each of them a Relative Potency Factor (RPF). EPA assumed that it could continue to use the same RPFs and simply apply them to the reduced cancer risk derived by IRIS. That is what it did in the proposed ESD. Proposed ESD at 9. This approach is invalid.

EPA has applied a similar method of applying a risk factor (Toxic Equivalency Factor or "TEF") to other chemicals in a class in the context of dioxins and furans and PCBs, for which there is widespread evidence to support a relative potency relationship. Similar evidence to support applying a relative potency factor across a class of chemicals does not exist for PAHs. In 2010, a Scientific Advisory Board convened for peer-review of the EPA's "Development of a Relative Potency Factor (RPF) Approach for Polycyclic Aromatic Hydrocarbon (PAH) Mixtures (February 2010 Draft)," supported only cautionary use of RPFs in its submission to EPA:

> Although the [Scientific Advisory Board] supports the use of benzo[a]pyrene (BaP) as the index compound for the RPF approach, the cancer slope factor for BaP is outdated and it is essential that EPA expeditiously update the cancer slope factor for BaP. The SAB also recommends that EPA consider developing a whole mixtures approach for PAHs. This approach could validate the RPF approach and in the future, could replace the RPF approach.

https://yosemite.epa.gov/sab/sabproduct.nsf/36a1ca3f683ae57a85256ce9006a32d0/F24FBBBACA6EEABA852578570040C547/$File/EPA-SAB-11-004-unsigned.pdf.

Scientific studies from the Oregon State University and affiliated experts, in consultation with EPA, found that the RPFs underestimate the cancer potency for some PAHs, as well as for mixtures that are present at the Portland Harbor site. Susan Tilton, *et al.*, "Mechanism-Based Classification of PAH Mixtures to Predict Carcinogenic Potential," *Toxicological Sciences*, 146(1), 135–145 (2015), Attachment E; Lisbeth K. Siddens, *et al.*, "Polycyclic aromatic hydrocarbons as skin carcinogens: Comparison of benzo[a]pyrene, dibenzo[def,p]chrysene and three environmental mixtures in the FVB/N mouse," *Toxicol. Appl. Pharmacol.*, 264(3), 377–386 (2012), Attachment F; *see also*, Oregon State University Superfund Research Program,

Proposed Changes to Portland Harbor Superfund infographic (2018), Attachment G, *available at* https://superfund.oregonstate.edu/sites/superfund.oregonstate.edu/files/image-album/infographics/infographics_0.jpg. The 2015 Tilton study explains:

> Currently, the primary method for assessing cancer risk of a complex mixtures is the relative potency factor (RPF) approach in which complex mixtures are evaluated based on a subset of individual component PAHs compared with BaP as a surrogate or reference. However, we and others have found this approach inadequate for predicting carcinogenicity of mixtures and certain individual PAHs, particularly those that function through alternative pathways or exhibit greater promotional capacity compared to BaP . . . . This approach is also insufficient for predicting carcinogenicity of complex real-world environmental mixtures of unknown composition.

The 2012 study showed that "overall tumor incidence did not correlate with relative potency calculated based on BaP equivalency . . . in which mixture RPFs are determined using reported RPFs for known components." Tilton, 137. The 2015 study proposed an alternative to RPFs: applying "whole mixture assessment." Tilton, 142-44.

In the face of these studies, EPA lacks an adequate scientific basis for applying the BaP cancer risk level to reset the cleanup and remedial action levels that apply to all carcinogenic PAHs. Additional research and analysis is required to establish the quantitative relationship among the several PAHs that have been included in the RPF approach. If the toxicity of BaP is 7.3 times greater, but the other PAHs are, in fact, no less toxic under experimental conditions, then the relative potency factors that have been used to relate one PAH to another are no longer valid and need to be re-evaluated.

The 2012 study also found that the carcinogenicity of mixtures of PAHs was greater than the sum of their parts. Specifically, the authors note: "The carcinogenicity with DBC and two of the mixtures was much greater than would be predicted based on published Relative Potency Factors (RPFs)." Based on these studies, the RPF approach is inadequate for mixtures, the form in which PAHs occur throughout Portland Harbor, as in most, if not all contaminated sites.

EPA needs to assess the cumulative and aggregate risks from carcinogenic PAHs and particularly PAH mixtures before it can use the RFP approach to apply the IRIS cancer risk factor for BaP to all cPAHs. It must do so before weakening the cleanup standards based on incomplete and flawed scientific information.

The administrative record for the proposed ESD contains a memorandum from a PRP attorney. The memo begins by taking issue with aspects of the remedy selected in the ROD based on evidence in the pre-ROD administrative record. In the absence of a clear mathematical

error, like the sediment cleanup levels for cPAHs based on shellfish consumption, or some other error appropriate for correction in an errata, these requests were a clear exercise in over-reaching.

In trying to make the case for weakening the remedy, the PRP legal memo makes two erroneous arguments. First, it contends that EPA must change the ROD based on the IRIS cancer risk estimate. In support, the PRPs cite two EPA memoranda that recommend that EPA generally use available IRIS assessments in preparing Superfund risk assessments. EPA, Use of IRIS Values in Superfund Risk Assessment, OSWER directive 9285.7-16 (December 21, 1993), p. 1; EPA, Human Health Toxicity Values in Superfund Risk Assessments, OSWER directive 9285.7-53 (December 5, 2003), p. 2. The EPA recommendations contain an important qualifier in stating that IRIS should *generally* be used; they also pertain to the initial development of EPA's Superfund risk assessments, not the actions EPA should take when it long ago completed its risk assessment for the site and adopted a ROD. This qualification is fleshed out in the remainder of the memoranda, which the PRP fails to mention. The memoranda do not address the situation where new toxicity information is brought to EPA's attention, nor do they not address ecological risks. 2003 Memo at 1; 1993 Memo at 2. EPA must consider and evaluate risk based on all credible and relevant information. 2003 Memo at 2; 1993 Memo at 2. Here as discussed below, peer-reviewed scientific articles provide such credible and relevant information and make it inappropriate to use the IRIS assessment to weaken the cPAH cleanup levels and remedial action levels.

Second, the PRP legal memo asserts that: (a) EPA has the authority to order a cleanup under CERCLA only when there is an unacceptable risk; and (b) the IRIS study proves there is no longer an unacceptable risk. This "legal" argument is tautological and falls apart on a closer examination of whether the IRIS study proves the current cleanup and remedial action levels would require remedial actions in places where no unacceptable risks are present. Admittedly, the ROD would result in unacceptable risks from eating fish and shellfish at the end of the cleanup and for an indefinite period of time thereafter. Cancer risks are unacceptable today and would remain so, and with less dredging, EPA lacks certainty that the risks would be brought down to levels it deems acceptable in the foreseeable future. Clearly unacceptable risks persist and will plague the people who depend on the river for their sustenance perhaps for the rest of their lives.

Ironically, the PRP legal memo includes the following quotations from *EPA's Comprehensive Five-Year Review Guidance*, OSWER 9355.7-03B-P (June 2001), p. 4-4 & 4-5:

> Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of remedy selection still valid? In conducting your five-year review, you should evaluate the effects of significant changes in standards and assumptions that were used at the time of remedy selection. *** Similarly, you should investigate the effect of significant changes in the risk parameters that were used to support the remedy selection, such as

> reference doses, cancer potency factors and exposure pathways of concern.
>
> Have toxicity factors for contaminants of concern at the site changed (*e.g.* Integrated Risk Information System (IRIS) evaluations?

These quotations confirm that the types of changes the PRPs are seeking should wait for the five-year review where they can be considered along with other new information.

B. EPA Must Ensure People Are Protected From Mixtures, Other Contaminants Of Concern, And Effects Other Than Cancer.

Portland Harbor is a complex site that involves far more than exposure to one contaminant. "In most areas of the Site, multiple COCs are comingled." Proposed ESD at 14. EPA has never accounted for the cumulative impacts of exposures to mixtures or the additive impacts of exposures to multiple hazardous contaminants specific to the site. Weakening the cleanup based on studies of a single chemical is unwarranted until these effects have been examined. EPA needs to make sure that non-cancer impacts or exposures to other contaminants of concern like PCBs (polychlorinated biphenyls) will be minimized to the maximum extent possible. EPA must also assess the toxicity of the PAH metabolites or breakdown products, which pose significant health concerns, and ensure that a myopic focus on the IRIS cancer slope factor will not conceal higher risks posed by the metabolites.

Mixtures of different chemicals are inadequately evaluated in the Proposed ESD. Any toxicology revisions to PAHs need to account for toxicological interactions among different chemicals, especially contaminants of concern in the Portland Harbor site, such as PCBs, DDx, and other pesticides. The ROD did not address mixtures sufficiently. This gap in data and analysis should not be taken to mean an absence of serious risks. EPA could collect empirical data on the toxicity of actual sediments and water from the site. EPA should not reduce the amount of dredging without conducting a full assessment of the risks posed by chemical mixtures.

The proposed ESD also would not address co-located COCs in the same fashion as in the ROD, which assumed that removing the COCs (individually or collectively) would reduce concentrations and exposure to other COCs. Weakening the cleanup standards and remedial action levels based on a certain type of risk from one contaminant removes one thread, but removing that thread unravels EPA's interwoven approach. Specifically, more PCBs, dioxins, metals, other organics, would be left in place by not removing sediments that are contaminated with PAHs. Before weakening the cPAH cleanup standards and remedial action levels, EPA must determine whether other contaminants of concern should be the drivers for cleaning up specific areas where cPAHs had been the driver. Appendix 11.

C. EPA Has Not Addressed The Critiques Of The Scientific Methodologies Underlying The PRP's Lobbying For Weaker Remedial Action Levels.

NW Natural deviated from EPA's methodology and offered its own novel approach in arguing that the remedial action levels for the nearshore area and navigation channel should be weakened. Both the 5 Tribes (Appendix A8) and Yakama (Appendix A11) took issue with NW Natural's proposal to weaken the cPAH RALs for sediments. NW Natural used two approaches: (1) a proportional adjustment approach; and (2) a risk reduction approach. The Tribes pointed out that both are inconsistent with the approach EPA used in the ROD, surface weighted average concentration reductions. They go onto to say it may not be appropriate to adjust the RALs based on a direct relationship with CULs. The proposed ESD is silent as to this critique. EPA appears to have used NW Natural's approach without subjecting it to scientific review or scrutiny.

Weakening the cleanup standards and remedial action levels is indefensible for another reason. EPA is averaging contamination across the site, yet certain areas like Gasco and Terminal 4 are hot spots that should be addressed as if each were a Superfund site on its own, given the contamination and pathways for human exposure and environmental migration and recontamination. Table 3 to the Proposed ESD documents enormous increases in both cancer risks and other health risks to children and infants at these sites under the proposed ESD. And EPA acknowledges, "[a]n increase in PAH loading to surface water is happening downstream of RM 6.3" where Gasco is located. EPA Community Information Session, at 19.

D. EPA Must Ensure the Environment is Protected.

The new IRIS assessment addressed one type of health effect, cancer. EPA must ensure that cleanup standards are adequate to protect the environment. EPA appropriately rejected NW Natural's lobbying to weaken the cleanup standards for the navigation channel because doing so would leave unquestionably unacceptable ecological risks. EPA Community Information Session, at 25-26.

The toxicity of BaP and other PAHs to ecological endpoints is unaffected by any change in predicted carcinogenicity in humans expressed in the IRIS report. Surface water, groundwater, and aquatic life would be less protected by the proposed ESD. EPA has failed to justify subjecting ecological resources, including fish, birds, benthic invertebrates and other animals, to greater risks. Nor has it assessed the full spatial and temporal extent of more severe contamination over time.

E. EPA Must Ensure the Cleanup of Gasco and Terminal 4 Proceeds Expeditiously and Will Be Protective of Public Health and the Environment.

There are known, multiple, co-occurring contaminants at the Gasco site and Terminal 4. EPA has not examined the combination of PAHs and other contaminants at these sites. It has weakened the triggers for dredging across the Superfund site in a way that will reduce the

amount of dredging that will occur at Gasco and Terminal 4. Since dredging is the only effective and permanent long-term treatment in the ROD, EPA is endorsing an approach that would lengthen the time the fish would be unsafe to eat and it would be relying on fish advisories, which are notoriously ineffective, to prevent people from being at risk of unacceptable health effects. EPA should not delay or weaken the cleanup of these two sites.

The ROD selected the cleanup remedy based on an integrated consideration of all of the Superfund factors. It was a holistic inquiry. Now EPA is proposing to dismantle it based on a piecemeal analysis of one new study. EPA needs to balance all the factors that go into selecting a remedy with the changes to toxicity of cPAHs being only one factor. Gasco would be particularly affected by the proposed changes. When EPA breaks down the changes in health risks by river mile, it becomes apparent that the risks around the Gasco site would increase substantially, for some indicators twofold. This could have an oversized impact on the total remedy because Gasco is not conductive to natural recovery and the orientation of the site makes it susceptible to scouring. This could move the contamination around and lead to recontamination.

F. EPA Failed To Consider The Impact Of Climate Change And Earthquakes, And Whether These Risks Warranted A More Protective Cleanup.

In the original ROD, EPA found that climate change would impact the Willamette River by increasing winter flow, decreasing summer flow, reducing snow slow packs and earlier peak flows in the Willamette River. *Portland Harbor ROD* at 127. Thus, EPA determined that "more high flow events are expected." *Id.* EPA also considered climate change impacts as a factor supporting the agency's decision to dredge contaminated sediments. *Id.* at 108. Specifically, EPA emphasized that "avoiding or minimizing impacts to the aquatic environment and floodway need to be considered and evaluated to meet CWA (Section 404) and federal floodway requirements as well as climate change impacts." *Id.*

In addition to increasing the frequency of high flow events, climate change will also impact the survival of migratory fish including salmon in the Columbia River and Willamette River basins. U.S. Global Change Research Program, "Chapter 24: Northwest," *Fourth National Climate Assessment* (2017), https://nca2018.globalchange.gov/chapter/24/. Reduced populations of salmon and other anadromous fish may cause local communities and Tribes to rely on resident fish and shellfish for a greater part of their diet. Moreover, increased stress to ecological systems from climate change including warming river temperatures, changes in flow and sediment transport, may require EPA to adopt more protective cleanup standards to support ecosystem resiliency. *See id*. (discussing cumulative stressors to aquatic ecosystems from climate change). EPA should be protecting against these climate vulnerabilities by strengthening cleanup standards, not weakening them.

EPA also failed to consider the impact earthquakes could have on cleanup. The Oregon Coast and the Portland Harbor have high seismicity risks. Or. Dep't of Geology, *Earthquake Risk Study for Oregon's Critical Energy Infrastructure Hub* at 39-56 (Aug. 2012),

https://www.oregongeology.org/earthquakes/CEI-Hub-report.pdf. An earthquake could cause slope failure along the Willamette River. *Id*. at 56. This could mobilize additional contaminants into the river, setting back cleanup efforts.

The Proposed ESD would weaken the ROD without considering climate change and earthquake impacts of reducing the amount of active remediation dredging. By reducing the area dredged, without considering the impacts of climate change or the risks of earthquakes, EPA violated its own procedures and placed the public at greater risk of exposure to hazardous contaminants. Guidance for EPA's Office of Solid Waste and Emergency Response ("OSWER"), which coordinates Superfund cleanups, noted that climate change may "impact continued remedy effectiveness" and recommended that "risk factors and rankings for risk-based cleanup strategies may need to be reassessed based on changing conditions." OSWER, Climate Change Adaption Implementation Plan, at Table 1 (June 2014), https://www.epa.gov/sites/production/files/2018-08/documents/oswer-climate-change-adaptation-plan.pdf. The report also noted that climate vulnerability includes "changes in frequency and intensity [of climate events] that may impact remedy effectiveness." *Id*. The risks posed by climate change like increased scour and mobilization of contaminated sediments in flood events must be considered when determining whether to remediate using dredging.

G. The Scientific Issues are Complex and Warrant a Fuller Review as Part of the Five-Year Review

The Portland Harbor ROD provided for 5-year reviews in perpetuity to assess whether the cleanup needs to be strengthened. The five-year reviews were compelled because the selected remedy will leave contamination in place above levels that allow unlimited use and unrestricted exposure.

Now EPA is proposing to weaken the ROD based on new risk information on a single contaminant. EPA has not obtained any monitoring to assess whether its assumptions underlying the ROD were accurate, nor has it included in its assessment a renewed holistic assessment of whether the cleanup will afford adequate protections to the people at risk. It is rushing to judgment based on limited information and a truncated assessment that fails to consider EPA's obligations under CERCLA to protect health and the environment and to favor permanent and effective remedies. It must slow down, collect relevant information, and fully assess the ramifications of any aspect of the proposed changes in a transparent and participatory process.

CONCLUSION

EPA should not finalize the proposed ESD. Instead, it should conduct monitoring, collect data, and conduct and obtain objective reviews of the relative carcinogenicity of the PAHs and of PAH mixtures. It must assess whether other contaminants of concerns and risks warrant additional remediation if the cPAH cleanup levels were weakened. It should also conduct an environmental justice assessment that investigates how communities of color and low-income communities would be affected by any weakening of the cleanup standards. This assessment should disclose how long fish advisories and beach closures would need to be in place and what

level of consumption of fish and shellfish would be safe and when. Only after a thorough and transparent examination of these scientific and environmental justice issues and analysis of the information obtained for the five-year review should EPA consider making any significant changes to the cleanup.

In the meantime, EPA should not tolerate any further delay of the cleanup. EPA assured the public that "once a ROD is signed for the Site, EPA will move quickly to initiate next steps with the PRPs toward remedial design and cleanup." EPA Responsiveness Summary Report at 2-10. EPA agreed that areas providing "recreation, fishing or other public uses, including high-use areas" should be prioritized for cleanup to limit human exposure "as quickly as possible[.]" *Id*. at 4-4. Delaying cleanup to lower cleanup standards and reduce the scope of the cleanup runs against the Superfund's polluter pays principle and over-arching goal of protecting health and the environment. EPA should move forward expeditiously with the cleanup to reduce the extreme risks posed to people and the environment from continued exposure to hazardous chemicals at Portland Harbor.

Respectfully submitted,

PATTI A. GOLDMAN
ASHLEY BENNETT
JAIMINI PAREKH
PAULO PALUGOD
Earthjustice
705 Second Avenue, Suite 203
Seattle, WA 98104
(206) 343-7340 | Phone
(206) 343-1526 | Fax
pgoldman@earthjustice.org
abennett@earthjustice.org
jparekh@earthjustice.org
ppalugod@earthjustice.org

cc: Richard Whitman, Director of Oregon Department of Environmental Quality
Kate Brown, Governor of the State of Oregon

ATTACHMENT A

A City's Lifeblood

By Julia Rosen

August 22, 2017

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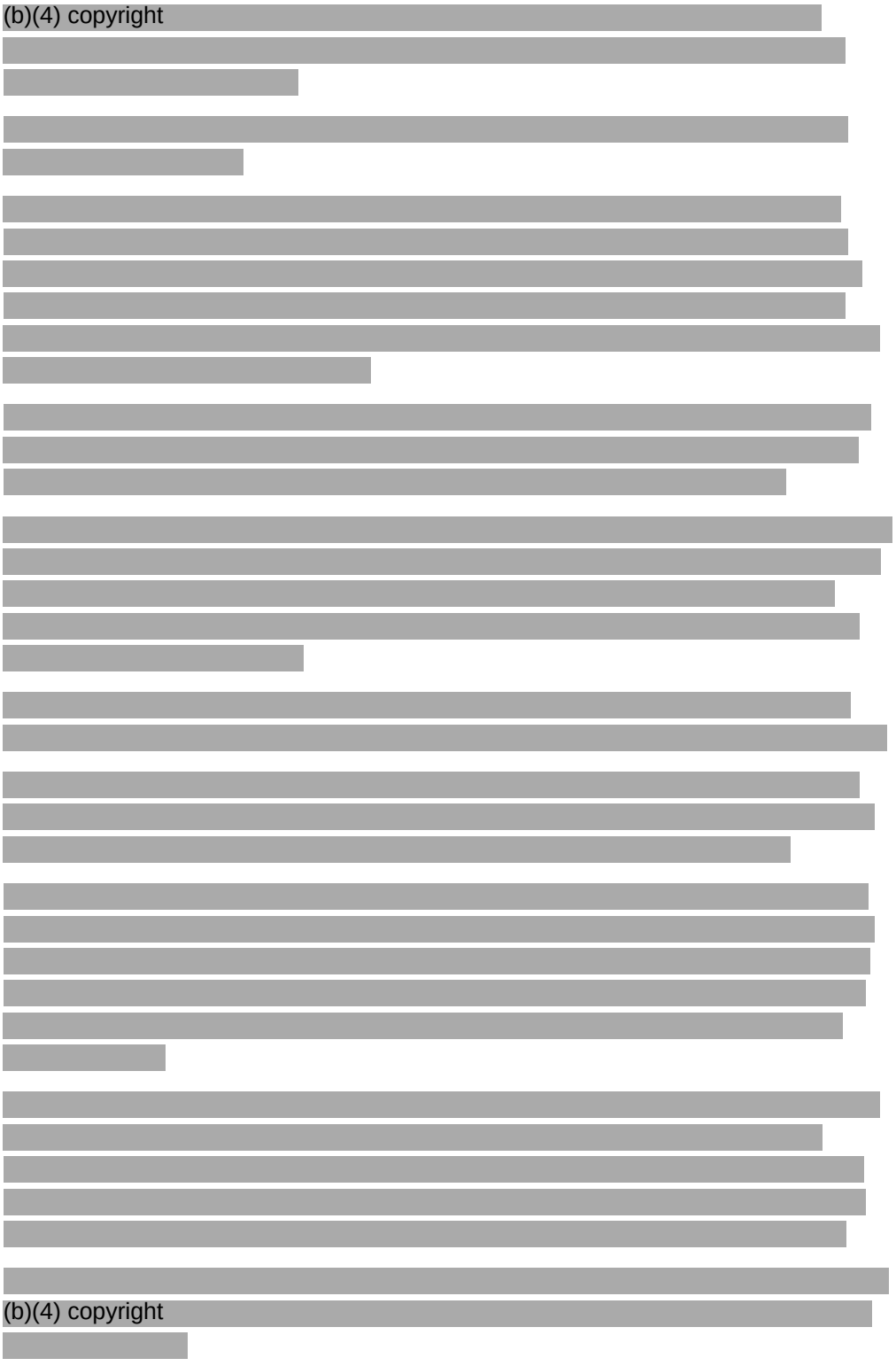

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Julia Rosen is a freelance journalist in Portland.

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o.hm@oregonhumanities.org
(mailto:o.hm@oregonhumanities.org)

ATTACHMENT B

To:
U.S. EPA Administrator Gina McCarthy
U.S. Regional Administrator, Region 10 Dennis McLerran

CC:
OR Senator Jeff Merkley
OR Senator Ron Wyden
OR Representative Earl Blumenhauer
OR Representative Suzanne Bonamici
OR Representative Peter DeFazio
OR Representative Kurt Schrader
OR Representative Greg Walden
OR Governor Kate Brown
OR Attorney General Ellen Rosenblum
OR House Speaker Tina Kotek
OR Representative Tawna Sanchez (incoming)
OR Representative Alissa Keny Guyer
OR Health Authority Director Lynne Saxton
City of Portland Mayor Charlie Hales
City of Portland Commissioner Nick Fish
City of Portland Commissioner Amanda Fritz
City of Portland Commissioner Steve Novick
City of Portland Commissioner Dan Saltzman
City of Portland Auditor Mary Hull Caballero
City of Portland Bureau of Environmental Services Director Michael Jordan

Subject: **Portland Harbor Community Coalition (PHCC) Public Comment on the Portland Harbor Superfund Site Proposed Cleanup Plan**

September 6, 2016

Dear Ms. McCarthy and Mr. McLerran:

We are the Portland Harbor Community Coalition (PHCC), an alliance of over a dozen member organizations and supporting groups. We represent those most impacted by contamination in the Portland Harbor Superfund site: Native people, Blacks/African Americans, immigrants and refugees, people experiencing houselessness/homelessness, and working-class Portlanders of all races and ethnicities.

The ways that our people have been impacted by Portland harbor pollution are varied and complex, but must be understood by EPA in order to make an informed decision that fulfills its ethical and legal responsibilities. Some of these groups and the impacts they suffer include (but are not limited to):

- First Nations: Northwest Native peoples have inhabited lands along the Willamette River since time immemorial, subsisting off of the fish, water, and land. Native people were able to sustain their villages and trade with other tribes in large part due to the salmon, lamprey, camas, wapato, and other foods that lived in abundance in and around the Portland Harbor. Today, industrial pollution in the Portland Harbor has disrupted those food sources, and severely compromises the health, livelihood, and culture of Native people who live and travel throughout the Columbia River Basin. Thousands of Native people from the Columbia River Basin Tribes still consume fish from the Portland Harbor and nearby waterways - and they do so with far greater frequency than non-Native people (58.7 grams per day, versus an estimated national average of 6.5 grams per day). In other words, Native adults of this area consume approximately nine times more fish than the national average. As noted by the Columbia River Intertribal Fish Commission, this "seriously calls into question the applicability and adequacy of using a national fish consumption rate to protect tribal members' health" (Columbia River Inter-Tribal Fish Commission (1994) *A Fish Consumption Survey of the Umatilla, Nez Perce, Yakama, and Warm Springs Tribes of the Columbia River Basin*). In recognition of this reality, as well as the fundamental right of tribal members to eat healthy fish, the states of both Washington and Oregon have adopted the more realistic fish consumption rate of 175 grams per day. As both states move into compliance with these new water quality rules to protect the fishing public (both native and non-native), EPA must ensure that its approach to harbor pollution is in alignment with those goals, and does not create backsliding. The PHCC believes that treaty rights extend to all tribal members, including those in the urban environment, who have been particularly impacted by harbor pollution. For instance, among the 12,000 member Turtle Mountain Tribe of North Dakota, fully half joined the war effort during World War II and went to work in Portland at Kaiser Industries near Vanport. Kaiser's current status as a Potentially Responsible Party underscores the importance of EPA's engagement with urban Native Americans, both to fully understand historic sources of contamination and to provide better remedies for groups who have suffered from multiple, inter-generational impacts from harbor pollution, whether that came from air, water, river food, or on-the-job exposure. Substantial reductions to toxic off-loading on traditional foods

like salmon, wapato and lamprey must be prioritized in any local clean-up plan if EPA expects to win community approval. Without such a focus, Native Americans will continue to suffer an unfair toxic burden from Portland Harbor pollution, as well as disproportionate health impacts that accompany the loss of their traditional foods.

- Black/African Americans: Black/African Americans first arrived in Portland in large numbers to work in the shipyards during World War II. Many fished in the Portland Harbor, and continue to fish there, eating contaminated fish, including carp and catfish. Black/African American shipyard workers were also exposed to toxic substances such PCBs, lead, and asbestos in the shipyards and toxic air in nearby neighborhoods. They were also prohibited from joining the Boilermakers Union. At the same time, workers and their families were forced to live in segregated neighborhoods for decades where they suffered disproportionately from harbor-related air pollution, and have since suffered (and continue to suffer) from the impacts of serial displacement - often to areas near brownfields - as the city has grown and changed. We are recommending several measures to ensure that the Portland Harbor cleanup does not contribute to the displacement and continued health disparities of Black/African Americans, and instead contributes to this group's prosperity.

- Immigrants and Refugees: Many people, especially Eastern European, Asian, and Latino immigrants and refugees subsist on resident fish from the Portland Harbor and are exposed to health risks from the contaminants in these fish. Families often depend on fish for protein, and view fishing as a continuation of their cultural traditions. Many people lack information about the dangers of consuming fish from the river, and others are aware of risks but are food insecure and have few other options. In 2011, out of a telephone survey of licensed anglers, it was estimated that about 7,800 people consume resident fish (catfish, bass, carp, etc.) from the Portland Harbor (and that 142,000 consume any fish - including non-resident fish). It was also estimated that 1,789 children consume resident fish. Those ~800 people who reported consuming the most resident fish eat about a serving a week - far more than the recommended amount. Licensed anglers with the most people reporting resident fish consumption were Eastern Europeans - 38% reported resident fish consumption. This survey does NOT account for NON-licensed anglers. It is estimated that about 13.5% of those fishing in the Portland Harbor do not have licenses. Many of those fishing without licenses are likely part of immigrant and refugee groups who fish for subsistence and cultural reasons (Sundling, D. and Buck, S. (2012) *Fish Consumption in the Portland Harbor*). These communities are dependent on fishing, and deserve to eat fish free of toxic substances. Some travel 40 miles from Woodburn, OR to catch fish to feed entire families, including small children and pregnant or nursing mothers.

- People Experiencing Houselessness: Hundreds of houseless people call the Portland Harbor home, particularly in the wake of the current housing crisis that has left many Portlanders without permanent and affordable shelter. Ongoing sweeps of homeless camps in inner Portland neighborhoods, including along Johnson Creek, also push people toward the waterfront, and onto contaminated beaches. People survive by fishing in the river, which

continues to expose them to dangerous contaminants and serious health risks. People who live along the river are also exposed to toxic substances such as lead, PCBs, and dioxins in the soil. And as the cleanup begins, they are at risk of being displaced again. Moreover, without substantial anti-displacement provisions (e.g. community benefits agreements, affordable housing construction, etc.), the cleanup and redevelopment of the waterfront will place low and moderate income residents in adjacent neighborhoods at further risk of displacement, and perhaps even exclude them from living near the river. EPA must provide strong anti-displacement measures to prevent disproportionate impacts on both the housed and houseless population - the latter is a population that is already experiencing significant psychological trauma, and that bears a disproportionate impact of river pollution due to its unavoidable reliance on both resident fish and basic human shelter along the waterfront. Anti-displacement provisions are now legally required in Portland's new Comprehensive Plan, which will take effect January 1, 2018; it is therefore very important that the EPA align its Record of Decision (ROD) with these laws.

Many people fall into more than one of these groups. Many members of these groups have also endured exploitation, oppression, and health disparities from living in other geographic areas, and for reasons that do not originate with Portland Harbor pollution. In other words, many of our people face cumulative and intergenerational impacts from Portland Harbor pollution, and some of these harms are compounding pre-existing harms. Decades and centuries of displacement away from the harbor area also means that impacted communities cannot be easily mapped and tracked, which means not all impacts can be measured. Furthermore, for reasons outlined above -- including economic necessity and cultural tradition, signs warning people of the dangers of eating contaminated fish do little to prevent people from consuming fish. Posting signs warning of fishing and fish consumption risks has proven *not* to be an effective solution to protect the health of people at risk of exposure to PCBs and other contaminants in the fish. They also do nothing to redress the damage that has been caused by over a century of pollution in the harbor.

This is why we are calling on the EPA to craft a Record of Decision that does far more to protect our communities than the current Proposed Cleanup Plan. The current Plan relies on monitored natural recovery and capping to remediate the vast majority of contaminants in the harbor. This Plan will do very little to alleviate the need for ongoing health advisories in the Portland Harbor, and therefore fails the communities who are most harmed by harbor pollution. For this reason, we absolutely cannot support EPA's proposed plan. It is also our position that EPA's Proposed Plan violates several of its own evaluation criteria, including but not limited to: #1 - Overall protection of human health and the environment, #3 - Long-term effectiveness and permanence, #4 - Reduction of toxicity, mobility, or volume through treatment, and especially #5 - Short-term effectiveness (the plan relies excessively on Monitored Natural Recovery - a long-term game of 'wait and see') and #8 - Community acceptance. This final criteria is addressed in the following section.

Impacted Communities Do Not Accept the Proposed Plan

We are not aware of any environmental, social justice, or grassroots organization that is in support of the EPA's proposed plan. We are not aware of any Treaty Tribe that is in support of the EPA's proposed plan. We are not aware of any entity supporting EPA's plan that is not itself a Potentially Responsible Party.

When evaluating community acceptance, EPA must do more than invoke the concept of the community, or 'the public'. It must acknowledge that the community most affected by toxic contamination is the most important voice when judging the adequacy of a remedy, as it has suffered the most serious harm. This harm is not at all comparable to the financial cost that is properly borne by PRPs; this recognition was part of the original understanding of CERCLA, and is embodied in the very name "Superfund", which presumed polluters would pay in advance, and would pay the full cost of their pollution to maintain a healthy environment.

It is in this light that we must condemn the extremely short, highly inadequate, and improperly managed public process surrounding this Proposed Plan. After nearly 16 years of intense negotiations between the EPA and the PRPs, the public has been rushed through a very hasty process that has included failure by EPA to translate key documents, failure to maintain a functioning email account to receive public comments, poorly publicized hearings that convey information in an overly technical manner, and are therefore not accessible to average attendees (let alone those most impacted, some examples of which are listed above), and refusal to grant reasonable extensions to the comment period. Between the winter of 2015 and the release of the proposed plan this summer, EPA also made a very sudden shift from preferring Alternative G to preferring Alternative I. This change was made without adequate consultation with the groups most affected by harbor pollution, and EPA's reasoning for this shift in priorities has still not been articulated. All of the issues just listed have been informed by an unrealistic timeline for a ROD. Peter deFur, the technical Superfund Advisor retained by the Community Advisory Group, told the public that for the EPA to reach a ROD by the end of the year, they will have to work in record time once the comment period ends, and that, more likely than not, *the ROD has already been written*.

This ROD timeline and its technical requirements, combined with the procedural failures outlined above, create serious doubt that what we have witnessed over the last few months was a meaningful public process. On July 19th, we requested that the EPA add an additional 30 days to the comment period so that our coalition partners would be afforded more time to work within their communities in light of these challenges, and in light of the complexity and size of the site. Due to many factors, including those listed above , and due in part to EPA's refusal to meet our prior request for a reasonable extension to the public comment period, we now believe that EPA's handling of this public comment period may violate Title VI of the Civil Rights Act, and are hereby requesting an additional 120 days to the present comment period so that the EPA can investigate its own Title VI compliance on the Portland Harbor Superfund Site. EPA should also be aware that PHCC will likely submit a formal Title VI complaint with the City of Portland for reasons that relate specifically to the city.

We are now standing together to call on the EPA to uphold our constitutional rights, our civil rights, and our fundamental human right to a clean environment. We also implore the EPA to honor the

federal government's treaties with tribal nations. The current proposed plan violates all of the above. This plan violates our civil rights by outright ignoring the needs and perspectives of those who have suffered most from environmental injustices, including, but not limited to, exposure to contaminants through fish consumption. This plan violates treaty rights by removing very little contaminated sediment, and by effectively relying on a perpetual health advisory for Portland Harbor fish. This means that fish are unsafe for Tribal members and others to consume, especially women of childbearing age, as well as pregnant women and nursing mothers, whose babies will experience neurological and developmental damage if they consume fish affected by harbor pollution.

Executive Order 12898 mandates that all federally funded projects overtly address environmental justice issues. This plan does not do that. We also note that the baseline studies of the Portland Harbor did not include an Environmental Justice analysis, unlike the Duwamish Superfund cleanup plan. This is an unacceptable oversight.

Instead of the current proposed plan - Alternative I - we call on the EPA to craft a ROD that will lift all fish consumption advisories in the Portland Harbor, in alignment with a modified, enhanced variation on Option G. We make this request in solidarity with the Yakama Nation, the Portland Harbor Community Advisory Group, and other concerned groups, and insist that this outcome must be guaranteed in the EPA's ROD. We also call on the EPA to require the most effective cleanup technologies available, regardless of cost, and to fully clean up the Portland Harbor in a way that does no harm to, and provides maximum recovery for, the Pacific lamprey.

Scientific evidence suggests that Pacific lamprey, which have been in existence for over 500 million years, are one of the foundational species of the Columbia basin, and that the potential loss of Pacific lamprey in the Columbia basin threatens the basin's ecological integrity. Already functionally extinct in much of their former range, one of the only places one can still find lamprey in significant numbers is at Willamette Falls. To live there, however, lamprey must run a chemical gauntlet through Portland Harbor to get to the ocean. In their early life Pacific lamprey live in the river sediment for up to 7 years, where they are likely ingesting significant amounts of toxic chemicals.

Lamprey is an incredibly important cultural food for Native Americans, and have traditionally provided an incredibly important source of nutrition, as they are exceptionally rich in fats (much more so than salmon). Due to the loss of lamprey throughout the Columbia Basin, many young tribal members today have never even seen a lamprey, and are losing historically important stories and ceremonies that are associated with them. We feel this not only presents a disparate impact on their health, but also violates their freedom of religious practice. And because of accumulated levels of toxic pollution in the Portland Harbor -- which EPA's current proposed plan (Option I) would fundamentally fail to address, lamprey are likely absorbing significant levels of contaminants in the Portland Harbor, which are likely being passed on to tribal fishing people -- some of whom say they can literally taste the chemicals in the lamprey. Willamette Falls remains an important tribal harvesting area for lamprey, and we feel that EPA's proposed plan does not do enough to protect and restore their abundance, nor does it protect the tribal members who rely on them for cultural, subsistence, and religious purposes. Given the critical significance of lamprey as a food source for endangered salmon, and the urgency of

providing for their recovery, we find it non-negotiable that EPA's ROD provide the strongest possible protection for lamprey. We are also particularly concerned that long-term capping will contribute to the extinction of lamprey, and feel that EPA did not adequately consider the impact of both Monitored Natural Recovery and capping on their habitat.

Finally, as people living in the Portland harbor vicinity, whose lives and livelihoods will be impacted by the cleanup *as well as the redevelopment that occurs following remediation*, we call upon the EPA to ensure that the final ROD includes provisions that guarantee the following outcomes:

- **Land:** Work with impacted communities (see above) to set aside land on or near the river for community use. This could support community-controlled habitat restoration, housing, gardens, environmental education, and other community-identified and community-controlled activities.
- **Healthy Fish:** Remove ALL highly and moderately contaminated sediments from the river, regardless of cost, so that fish are safe for EVERYONE to eat.
- **Housing Justice:** Give 6 months notice before beginning the cleanup in areas where houseless people are living. Provide funds for permanent, affordable housing for anyone displaced by cleanup (whether housed or houseless). Institute robust anti-displacement provisions (i.e., as outlined in the City of Portland's Comprehensive Plan) to ensure that low- and middle-income residents have access to permanently affordable housing in nearby neighborhoods.
- **Jobs:** Train and hire local residents from impacted communities, women, and minority-owned firms for long-term, family-wage cleanup jobs. Sign Community Benefit Agreements to ensure that benefits accrue to the local community, and to those who have been most impacted by river pollution. Pursue a meaningful partnership with local tribal governments.
- **Pollution Controls:** Include ongoing pollution controls in the final cleanup plan, including from upriver sources. Do not allow re-contamination from upland sources. Use EPA enforcement authority to clean up major hot spots like Arkema, shut off upland pollution sources, and define an appropriate, diminished role for Oregon DEQ during the cleanup process.
- **Air Monitoring:** During the entire length of cleanup process, require the most effective fuel/emissions filters available and ongoing monitoring to minimize exposure for all cleanup-related activities, including but not limited to freight, dredging, barges, and other equipment. If air toxins are found to exceed acceptable levels, immediately take measures to intervene.
- **Water Monitoring:** During the entire length of the cleanup process, provide rigorous water monitoring, and make data available through a public database so that the public is aware of pollution levels at various locations, particularly those that are important for recreation and fishing access.
- **Public Access**: Increase access to public lands along the river. Prioritize impacted communities – including youth – in the design, cleanup, restoration, and development of new sites.
- **Transport & Disposal:** Ensure the health and safety of people and the environment in the transport and disposal of toxic substances. Do NOT store contaminated sediment next to the river. Do NOT dispose of contaminated sediment in a way that will negatively impact the health of people living or working near the disposal site. Use known best practices to avoid

off-gassing and volatilization of toxic substances, and ensure that all workers are trained in these practices.

- **Community Support:** Establish a fund to assist communities impacted by historic and ongoing contamination, as well as cleanup impacts, until fish advisories are lifted. This fund could support community health resources for families who have been harmed by harbor pollution, and help diagnose and prevent health problems that may be related to the absorption of pollutants via fish, riverside food plants, exposure from pollutants from Portland Harbor jobs, or use of contaminated beaches.
- **Polluters Pay:** Ensure that impacted communities (see above) are not burdened by the cost of cleanup. Require performance bonds from PRPs to cover these cleanup costs.

While we acknowledge EPA's position that they have met the minimum legal requirements for public outreach, we do not believe EPA has conducted an outreach process that is adequate to address the needs of those most impacted. We strongly urge the EPA to take a different approach in crafting the ROD, and prioritize environmental justice communities that have been most impacted by the river's pollution, and which have the most to gain, or lose, as the EPA continues to make decisions on our behalf.

Thank you.

Portland Harbor Community Coalition Members and Supporters: **[DRAFT sign-on list – subject to change - yellow highlight means the group has agreed to sign on to final letter]**

AFSCME Green Caucus
American Indian Movement - Portland Chapter
Ancient World Crafts
Asian Pacific American Network of Oregon
Audubon Society
Collective Care Services
Columbia Riverkeeper
East European Coalition
Groundwork Portland
Iraqi Society of Oregon
Jamaican Homestyle Cuisine
Jose Gaustellum Painting
Lideres Verdes
Madinah Cafe
Mattie Khan's Kitchen
MBZW Muzak
Muhammad Study Group of Portland
Native American Youth and Family Center
PDX Bubble Boys
Portland Center for Self Improvement
Portland Harbor Community Advisory Group

Portland Youth and Elders Council
Raging Grannies
ReBuilding Center
Right 2 Survive
Right 2 Dream Too
Screwloose Studios
SEIU 503, OPEU
Sierra Club - Oregon Chapter
Strawberry Pizza Parlor
The S.O.F.
Urban League of Portland
Wisdom of the Elders

Contact: pdxharborcommunitycoalition@gmail.com

ATTACHMENT C

PETER LEE deFUR

Curriculum Vitae – July 2015

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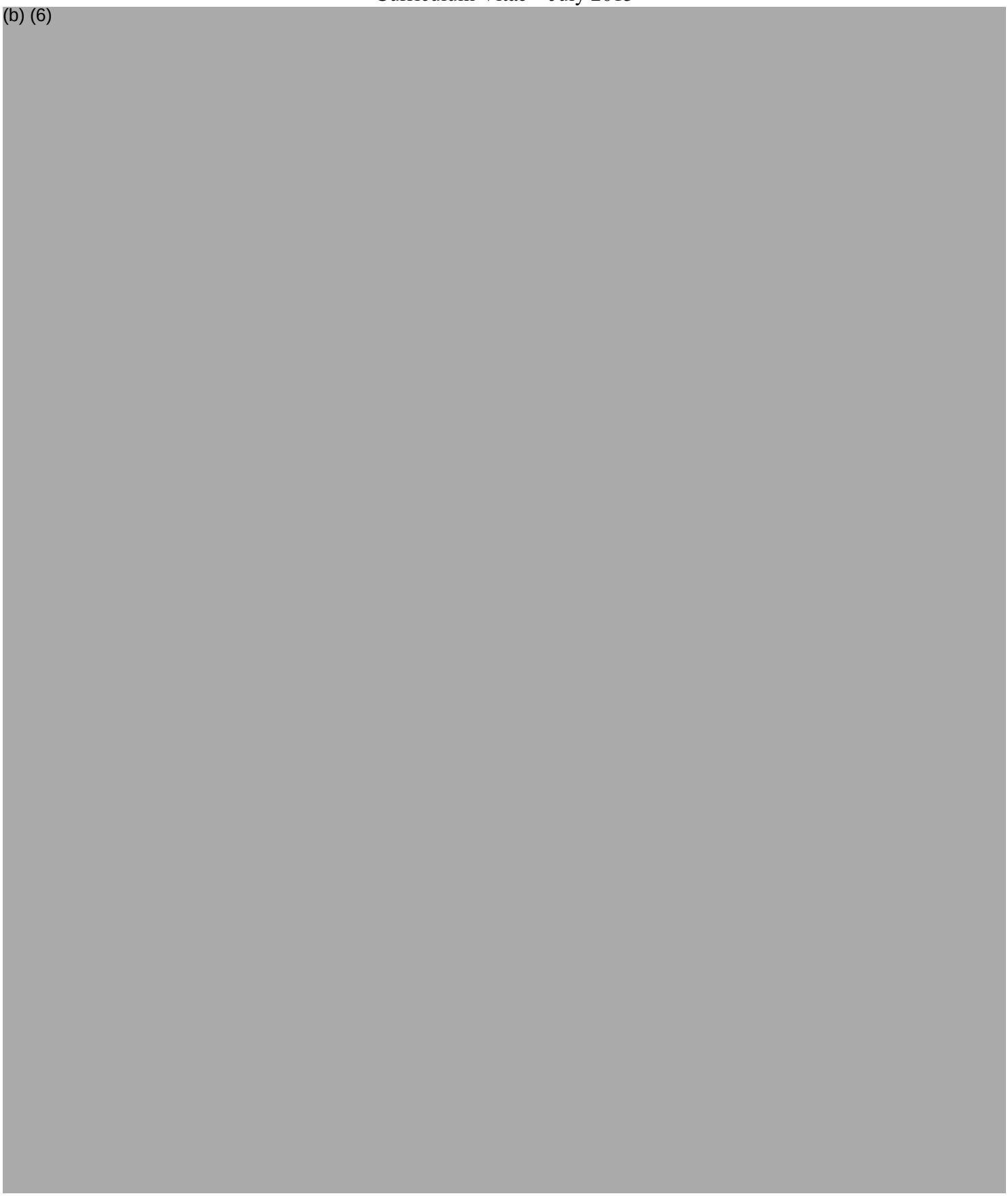

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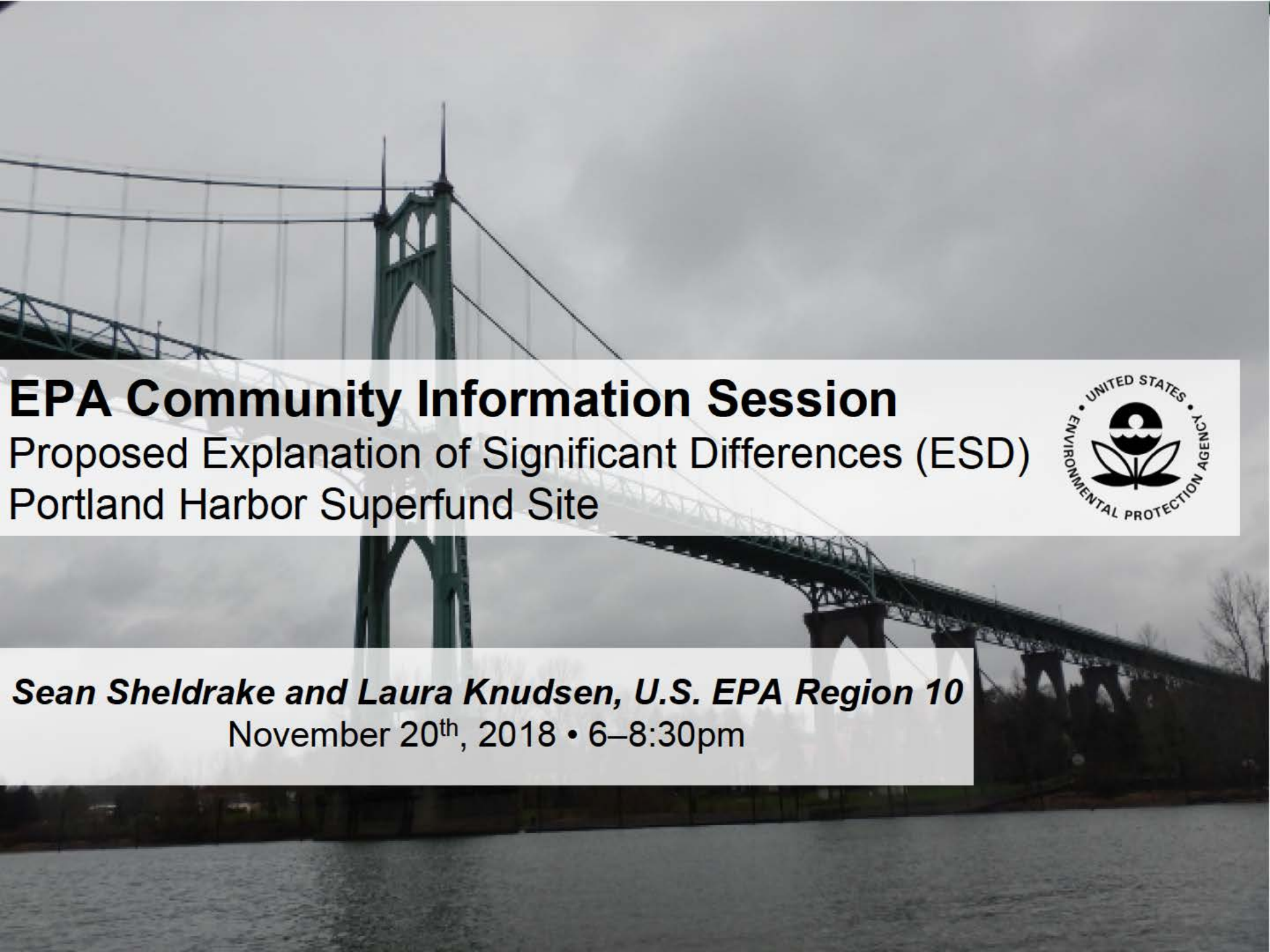
ATTACHMENT D



EPA Community Information Session

Proposed Explanation of Significant Differences (ESD)
Portland Harbor Superfund Site

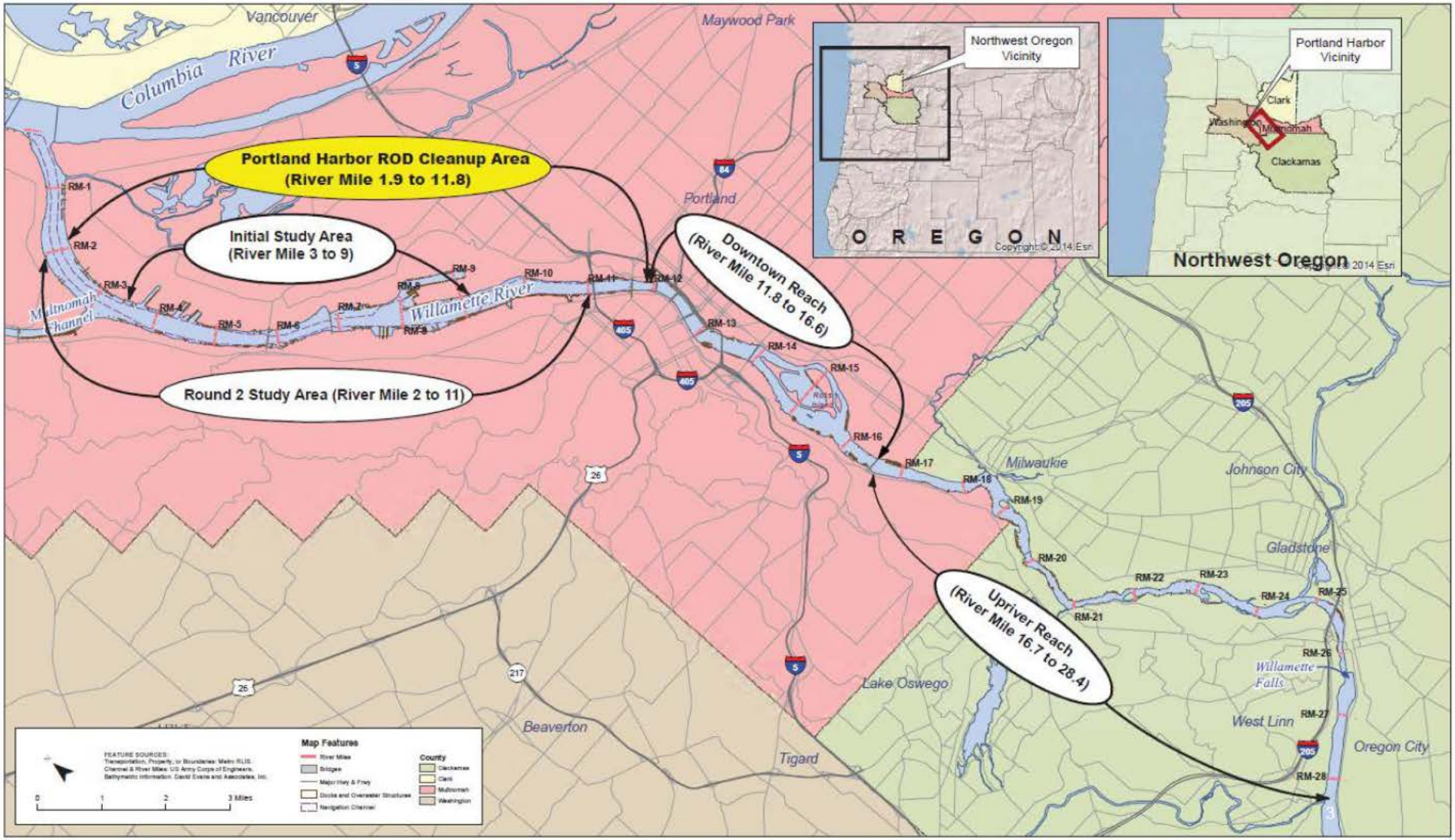
Sean Sheldrake and Laura Knudsen, U.S. EPA Region 10

November 20th, 2018 • 6–8:30pm

Agenda

- Site background
- Why is there a proposed ESD (Explanation of Significant Differences)? What is a proposed ESD?
- What does this change mean for the Portland Harbor Superfund Site?
- Question and answer session

Site Background



Site Background

These Focused COCs are:

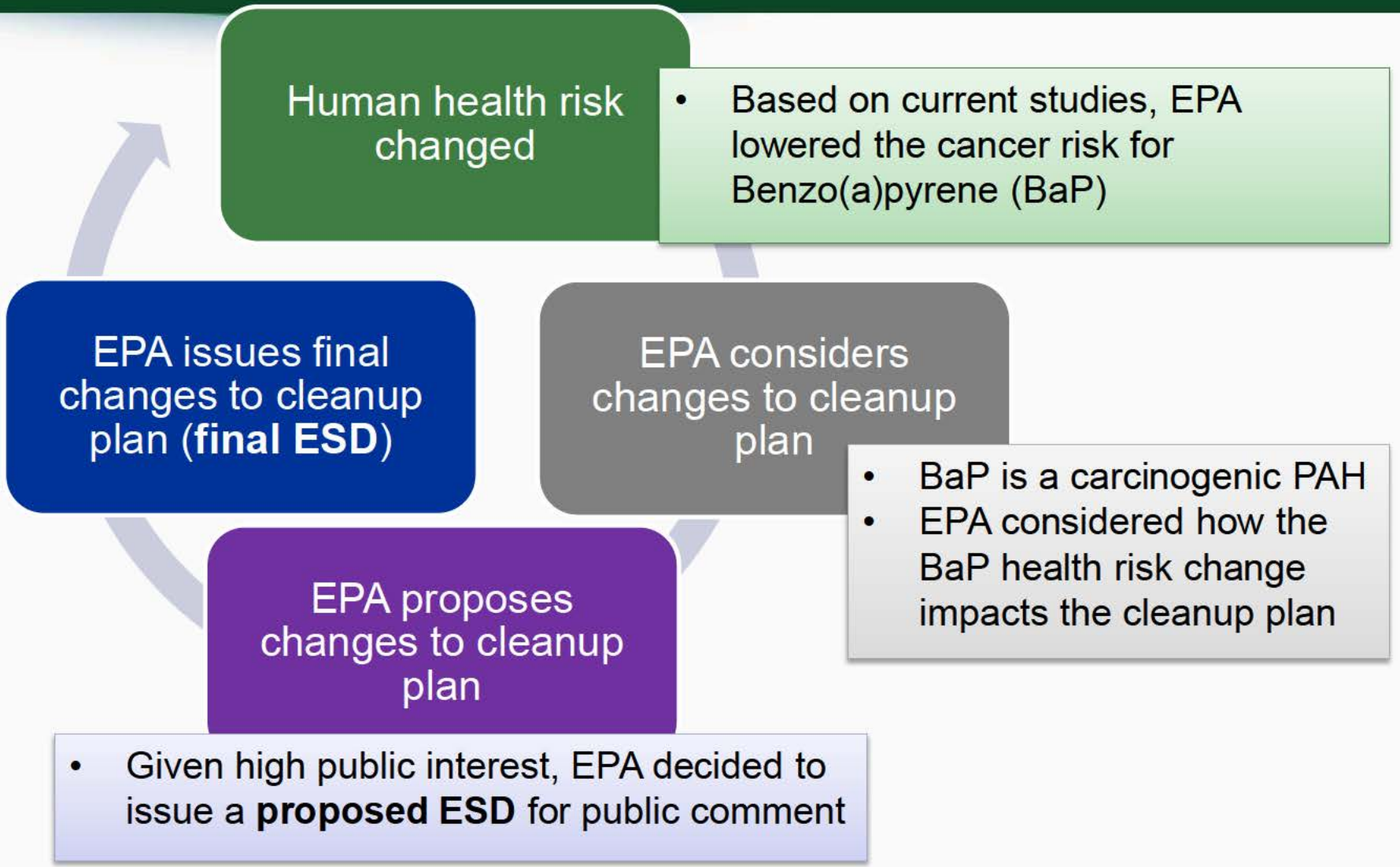
- ❑ The most widespread
- ❑ Have the most associated risk
- ❑ Address other COCs

- **Focused Contaminants of Concern**
  - ➢ **Polychlorinated Biphenyl (PCBs)**
    - ☆ **Where Do They Come From?** Used in electrical equipment, oil, plastics
  - ➢ **Polycyclic Aromatic Hydrocarbons (PAHs)**
    - ☆ **Where Do They Come From?** Produced when coal, oil, and gas are burned, spilled, etc.…
    - ☆ **Benzo(a)pyrene (BaP) is a PAH.** BaP cancer risk is used to assess cancer risk for other carcinogenic PAHs
  - ➢ **DDx (DDT, DDE, DDD)**
    - ☆ **Where Do They Come From?** Commonly used in pesticides
  - ➢ **Dioxins/Furans**
    - ☆ **Where Do They Come From?** Created when certain products are made, like herbicides, pulp/paper, or when products are burned.

Why is there a proposed Explanation of Significant Differences?

What is a proposed Explanation of Significant Differences?

Proposed ESD (Explanation of Significant Differences?): What is it and why?



Why did the Benzo(a)pyrene health risk change?

- EPA's Integrated Risk Information System (IRIS) updated their BaP assessment in 2017
- EPA's IRIS program has worked for over 10 years on this assessment
- The BaP IRIS assessment was extensively reviewed with many agencies and scientists (next slide)
- Current studies show that cancer risk for BaP is about seven times less toxic for people who contact or ingest the chemical

What is the EPA IRIS Program?

- **Created in 1985** to provide a database of human health assessments for chemicals
- **Goal:** Foster consistency in the evaluation of chemical toxicity across EPA

Who reviewed this BaP cancer health risk change?

- **Some of the other Agencies who reviewed:**
  - Agency for Toxic Substances and Disease Registry
  - Department of Defense
  - National Aeronautics and Space Administration (NASA)
  - National Institute for Occupational Safety and Health
- **Public comments:** Assessment released for public comment in 2013
- **Peer review by 27 independent, expert scientists including:**
  - University of Washington, Seattle WA
  - University of California, Irvine CA
  - University of New Mexico, Albuquerque NM
  - Harvard School of Public Health, Boston MA
  - The University of Texas at Austin, Austin TX
  - University of Illinois, Chicago IL
  - National Institute of Health, Bethesda MD
  - Department of Statistics and Evaluation, American Cancer Society, Atlanta GA

What does this BaP change mean for the Portland Harbor Superfund Site?

What are PRGs, PTW and RALs?

- **Cleanup Levels:** Long-term contaminant concentrations that the cleanup must achieve to meet the Remedial Action Objectives. These also may be referred to as Preliminary Remediation Goals (PRGs).
  - Developed for all contaminants of concern on a media-specific (sediment, water, clam tissue, etc…) basis
- **Highly Toxic Principal Threat Waste (PTW):** Contaminant source material that requires special management due to high toxicity
- **Remedial Action Levels (RALs):** Define areas where capping and/or dredging must be conducted to facilitate natural recovery throughout the site
  - Separate RALs established in Portland Harbor for Navigation Channel and nearshore sediments

What does this mean for the Portland Harbor Superfund Site?

★ = Affected by change

RAO		Media
Human	RAO 1	Sediment ★
	RAO 2	Biota ★
	RAO 3	Surface Water
	RAO 4	Groundwater
Eco	RAO 5	Sediment
	RAO 6	Biota
	RAO 7	Surface Water
	RAO 8	Groundwater
H&E	RAO 9	Riverbanks

Remedial Action Objectives (RAOs)

- **RAOs:** Media specific goals for protecting human health and the environment
- Cleanup plan established RAOs and cleanup levels for sediment, groundwater, surface water, and river bank soils
- Any change in remedial action levels must consider impact on all RAOs

What does this mean for the Portland Harbor Superfund Site?

EPA

"BIG PICTURE"

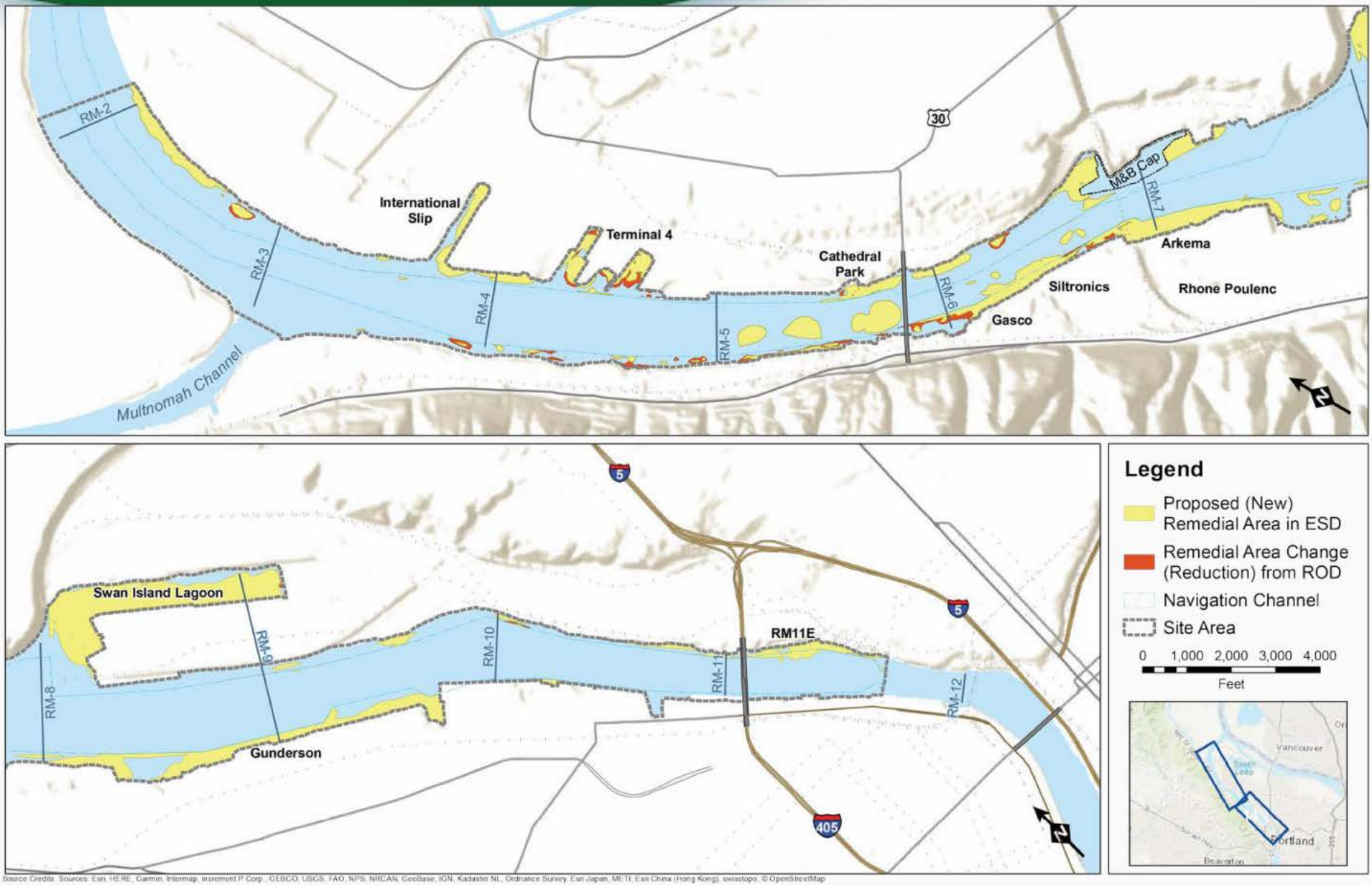
	Total Remedial Area (Acres)	Cubic Yards (CY) Dredging & Riverbank Excavation	Cost
ROD	~364	~3.02 million	~$1.05 billion
Proposed ESD	~347	~2.94 million	~$1.015 billion
Change *From ROD to Proposed ESD*	~17 *4.67% decrease*	~80 thousand *2.66% decrease*	~$35 million *3.33% decrease*

What does this mean for the Portland Harbor Superfund Site?

EPA

Scenario	Impacted Area	ROD Value	Updated Value
Direct Contact cPAH Beach Sediment cleanup level	Beach Areas	12 µg/kg (parts per billion)	85 µg/kg
Direct Contact cPAH In-Water Sediment cleanup level	Nearshore sediment (excluding beach areas)	Not Included (106 µg/kg)	774 µg/kg
Clam Tissue Consumption cPAH Target Level	Site-Wide	7.1 µg/kg	51.6 µg/kg
Clam Consumption cPAH Sediment cleanup level	Site-Wide	**3,950 µg/kg** *(This should have been 39.5 µg/kg)*	1,076 µg/kg
Benthic Risk total PAH Sediment cleanup level	Site-Wide	23,000 µg/kg	23,000 µg/kg ***No Change Proposed***
Highly Toxic cPAH PTW Threshold	Site-Wide	106,000 µg/kg	774,000 µg/kg
Nearshore total PAH RAL	Nearshore Sediment (Outside the Navigation Channel)	13,000 µg/kg	30,000 µg/kg
Navigation Channel total PAH RAL	Navigation Channel Sediment	170,000 µg/kg	170,000 µg/kg ***No Change Proposed***

What does this mean for the Portland Harbor Superfund Site?



How can I be involved?

- **Provide written comments to EPA on the proposed ESD until Friday, December 21:**
  - Send comments via **e-mail** to HarborComments@epa.gov
  - **Mail** Comments: Attn: Portland Harbor Superfund Comments, U.S. Environmental Protection Agency, 805 SW Broadway, Suite 500, Portland OR 97205
- **Review EPA's November 1st webinar recording of the proposed ESD presentation: https://bit.ly/2zqWeIL**
- **Attend EPA's December 12th public forum**
  - **Day & Time:** Wednesday, December 12th, 5:30-8:30pm
  - **Location:** Revolution Hall, 1300 SE Stark St, Portland OR 97214
- **Visit EPA's Portland Harbor website for the most up-to-date information: www.epa.gov/superfund/portland-harbor**

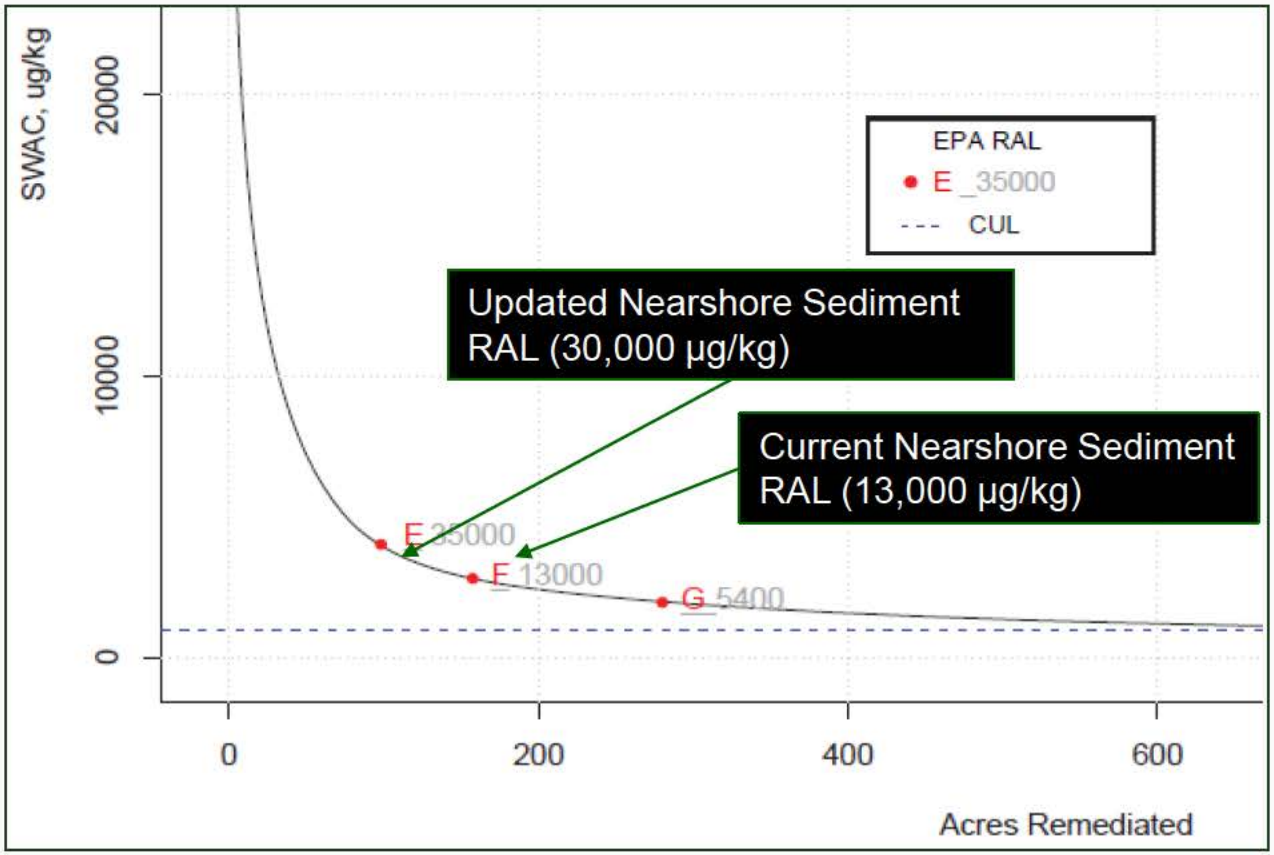
More Questions?

- **Sean Sheldrake,** EPA Remedial Project Manager
  - **E-mail:** sheldrake.sean@epa.gov
  - **Phone:** 206-553-1220
- **Laura Knudsen,** EPA Community Involvement Coordinator
  - **Email:** knudsen.laura@epa.gov
  - **Phone: 206-553-1838**

Extra Slides

Proposed Nearshore Total PAH RAL Change

- **EPA proposes revising the total PAH nearshore RAL from 13,000 µg/kg to 30,000 µg/kg:**



Why did the proposed navigation channel total PAH RAL not change?

- **The total PAH navigation channel RAL of 170,000 µg/kg <u>will not change</u> because of human health and benthic (critters that fish eat) risk that is present**

- **Other Issues:**
  - The navigation channel has benthic community habitat
  - The total PAH cleanup level of 23,000 µg/kg is exceeded in the navigation channel between RM 5 – 7 with unacceptable risk to the benthic community
  - Natural recovery processes such as sediment deposition within the navigation channel are not happening for contaminated areas between RM 5 – 7
  - An increase in PAH loading to surface water is happening downstream of RM 6.3

Development of Human Health Clam Consumption Clean-up Levels

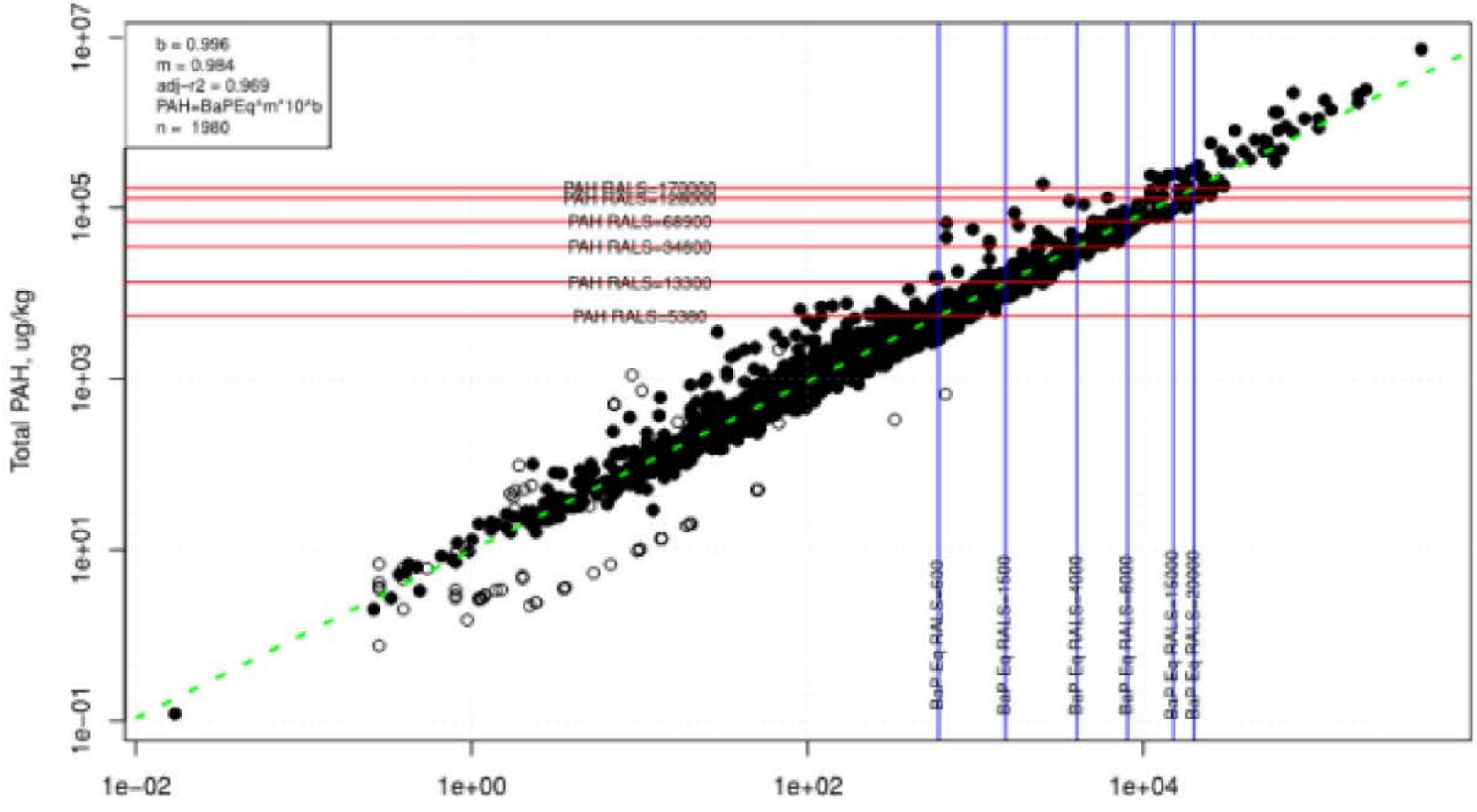
- The human health clam consumption target tissue level increases by a factor of 7.3 from 7.1 µg/kg to 51.6 µg/kg due to the BaP health risk change

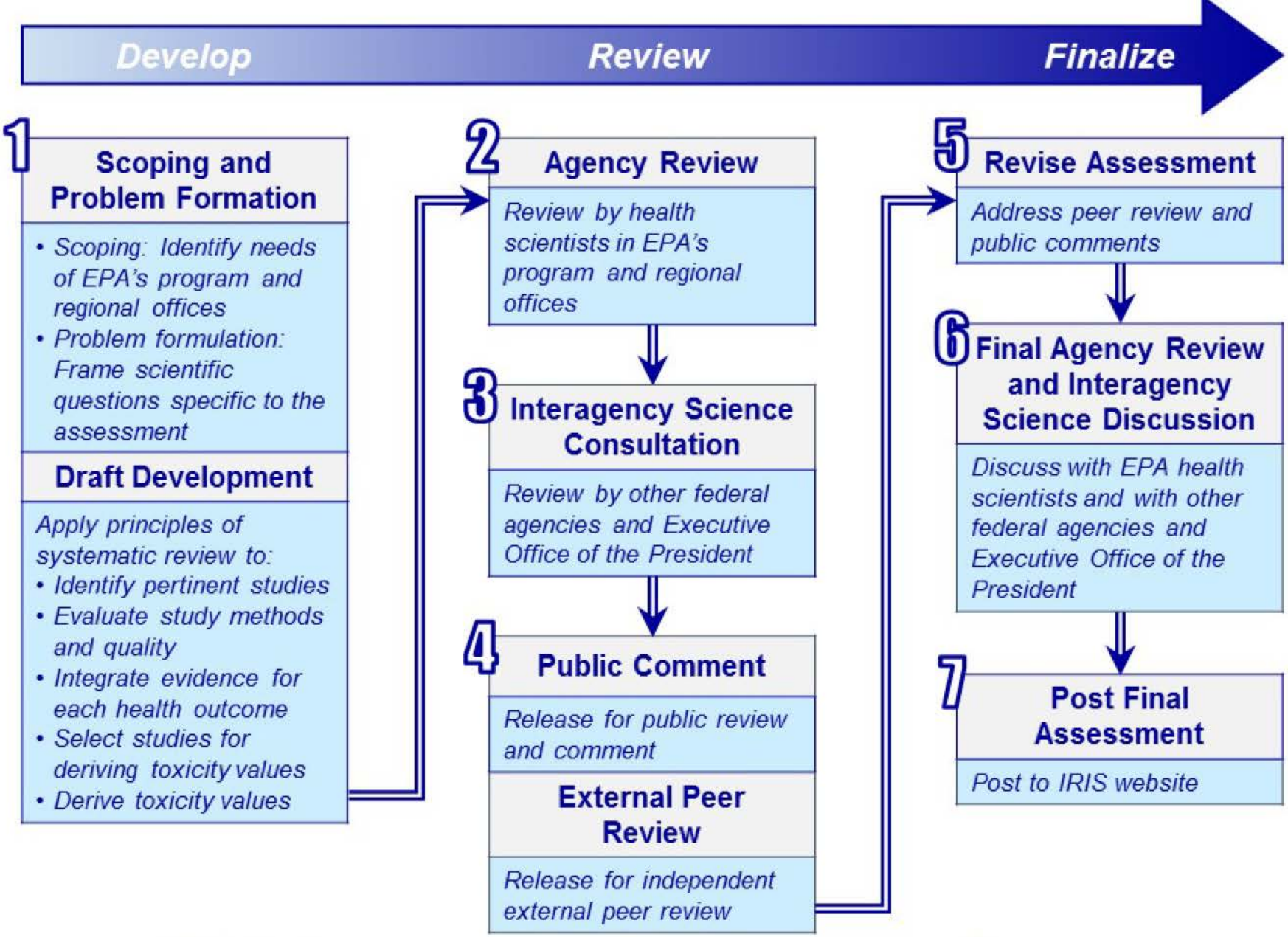
- The relationship between cPAH (BaP Eq) clam tissue levels is a **non-linear** log-log relationship represented by the following equation:

$$ln(PRG_{sed}) = \frac{((ln(C_{tissue}) - (\ln(f_{lipid}) - \ln(CF) + 2.47)}{0.6} + ln(f_{oc})$$

- Based on the non-linear relationship, the cPAH human health clam consumption CUL increases from 39.5 to 1,076 µg/kg due to the BaP health risk change

Total PAH - cPAH Relationship





IRIS Assessment Development Process

The 7-step process has not changed. This figure refines earlier versions and includes the 2013 IRIS enhancements and the incorporation of systematic review approaches.

Doesn't a decrease to 1 per mg/kg-day from 7.3 per mg/kg-day mean BaP is more carcinogenic?

- **Short Answer**: No
- **This decrease means that someone has less risk of developing cancer if they are exposed to BaP**

Cancer Risk = Lifetime Average Daily Intake x Cancer Slope Factor (CSF)

If **CSF** goes down, **Risk** goes down

- **However, the cleanup level may* increase (less restrictive) because one divides by the cancer slope factor (CSF):**

$$CUL_{sediment} = \frac{Target\ Excess\ Cancer\ Risk\ x\ Averging\ Time}{CSF\ x\ Exposure\ x\ Age\ Adjusted\ Dermal\ Contact\ x\ 10{-}6\ kg/mg}$$

- **Remedial Action Levels (RALs) may* also increase to prevent cleaning up sediments that do not pose unacceptable risk**

**Depends on the area within the Site*

Has EPA updated health risk values to be less toxic for other chemicals?

- IRIS does not keep track of this type of information.
- IRIS evaluates the available data with current methodologies to interpret the currently available science as best we can.
- This evaluation can lead to characterizations of toxicity that may be relatively more or less toxic than previous characterizations.

Did EPA consider the non-cancer reference dose (RfD) change?

- **Short answer:** Yes, EPA previously considered the RfD change.
- **Long answer:**
  - The Toxicological Review of Benzo(a)pyrene (USEPA, 2017) also included a non-cancer oral reference dose of 0.0003 (mg/kg-day).
  - This value was utilized in the development of Preliminary Remediation Goals (PRGs) for the Portland Harbor Site (See Table B3-2 of the Portland Harbor Feasibility Study).
  - PRGs for non-cancer risk presented in Appendix B of the Portland Harbor Feasibility Study, are significantly higher than cancer risk and thus are not a factor for developing PAH Cleanup Levels at the Portland Harbor Site.

What was the exact cancer slope factor change for BaP?

PREVIOUS CSF	REVISED CSF* *Revised January 19, 2017
7.3 per mg/kg-day	1 per mg/kg-day

Application of Benzo(a)pyrene Potency Equivalence Factor

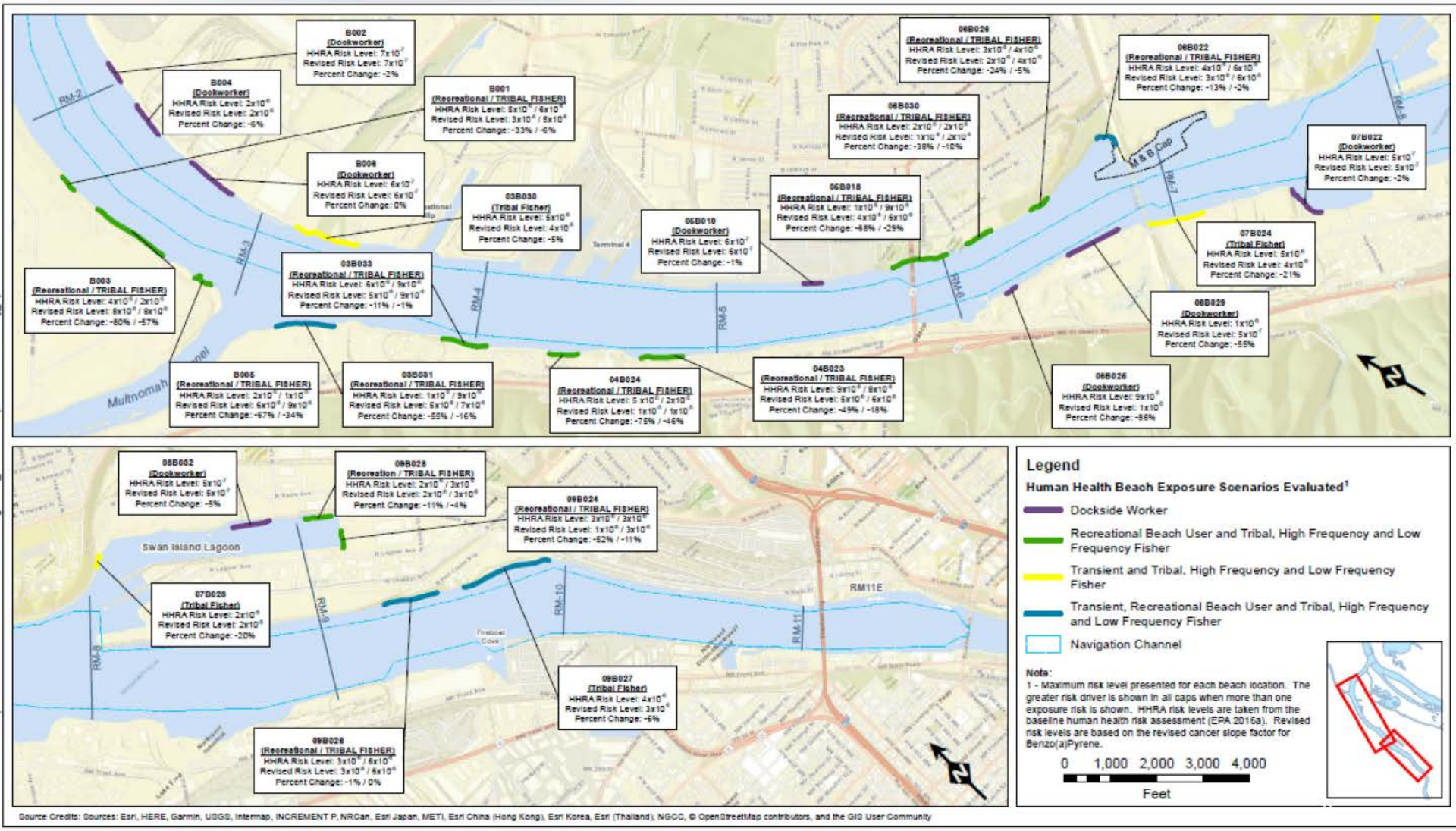
- The carcinogenicity of PAHs is assessed relative to benzo(a)pyrene using a potency equivalence factor (PEF)
  - PEFs range between 1 and 0.001 for individual carcinogenic PAHs
  - Allows estimation of total carcinogenic PAH risk measured as benzo(a)pyrene equivalents (BaPEq)
  - The BaP slope factor change affects all carcinogenic PAHs

Location	Chemical	EPC (ug/kg)	B(a)P CSF (mg/kg-day)$^{-1}$	Potency Equivalent Factor	Adjusted CSF (mg/kg-day)$^{-1}$	Daily Dose (mg/kg-day)	Cancer Risk
RM 7 West	Benzo(a)anthracene	2.2E+03	1	0.1	0.1	7.20E-07	7.E-08
RM 7 West	Benzo(a)pyrene	1.7E+03	1	1	1	5.50E-07	6.E-07
RM 7 West	Benzo(b)fluoranthene	4.5E+03	1	0.1	0.1	1.45E-06	1.E-07
RM 7 West	Benzo(k)fluoranthene	1.4E+03	1	0.01	0.01	4.60E-07	5.E-09
RM 7 West	Chrysene	-	1	0.001	0.001	-	-
RM 7 West	Dibenzo(a,h)anthracene	7.1E+02	1	1	1	2.30E-07	2.E-07
RM 7 West	Indeno(1,2,3-cd)pyrene	1.4E+03	1	0.1	0.1	4.50E-07	5.E-08
RM 7 West	Total cPAHs as B(a)P Equivalents						**1.E-06**

Evaluation of Children and Infants in the Portland Harbor HHRA

- **Carcinogens**
  - The **Human Health Risk Assessment (HHRA)** evaluated a combined adult/child exposure scenario for recreational beach users and all fish consumption exposure scenarios
  - The HHRA did not consider children in the clam and crayfish consumption exposure scenario
- **Non-carcinogens**
  - The HHRA evaluated a child recreational beach user and all fish consumption exposure scenarios
  - The HHRA evaluated breastfeeding Infants for all adult exposure scenarios for select bioaccumulative chemicals (PCBs, DDx, PBDEs, and dioxin and furans)
  - The HHRA did not consider children in the clam and crayfish consumption exposure scenario

Human Health Beach Exposure



ATTACHMENT E

Mechanism-Based Classification of PAH Mixtures to Predict Carcinogenic Potential

Susan C. Tilton[*,†,1], Lisbeth K. Siddens[*,†], Sharon K. Krueger[*,‡], Andrew J. Larkin[*,†], Christiane V. Löhr[§], David E. Williams[*,†,‡], William M. Baird[*,†], and Katrina M. Waters[*,¶]

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ATTACHMENT F

Published in final edited form as:
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Polycyclic aromatic hydrocarbons as skin carcinogens: Comparison of benzo[*a*]pyrene, dibenzo[*def,p*]chrysene and three environmental mixtures in the FVB/N mouse

Lisbeth K. Siddens[a,b], **Andrew Larkin**[a,b], **Sharon K. Krueger**[b,c], **Christopher A. Bradfield**[d], **Katrina M. Waters**[b,e], **Susan C. Tilton**[b,e], **Cliff B. Pereira**[b,f,g], **Christiane V. Löhr**[g,h], **Volker M. Arlt**[i], **David H. Phillips**[i], **David E. Williams**[a,b,c,g,*], and **William M. Baird**[a,b,g]

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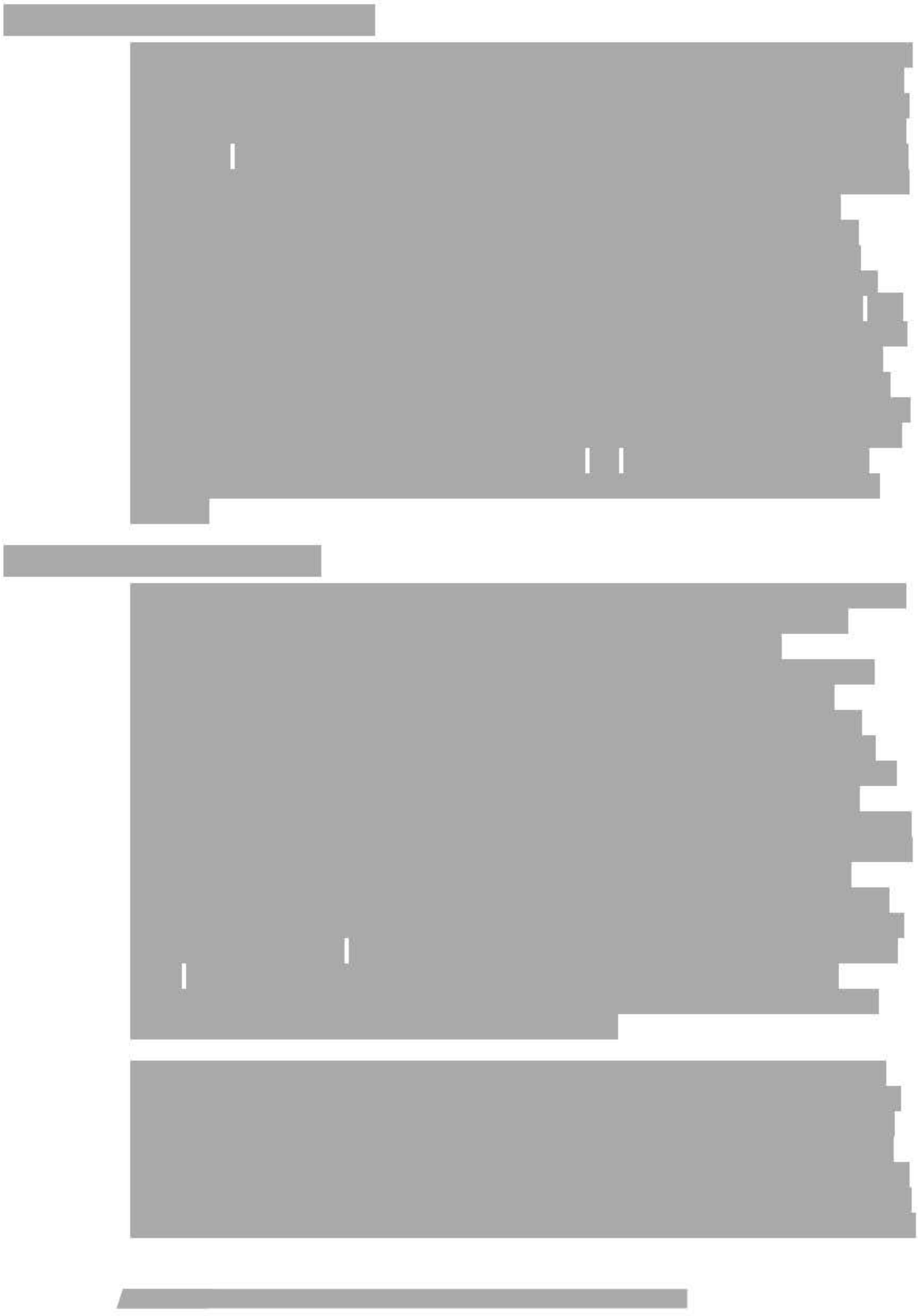

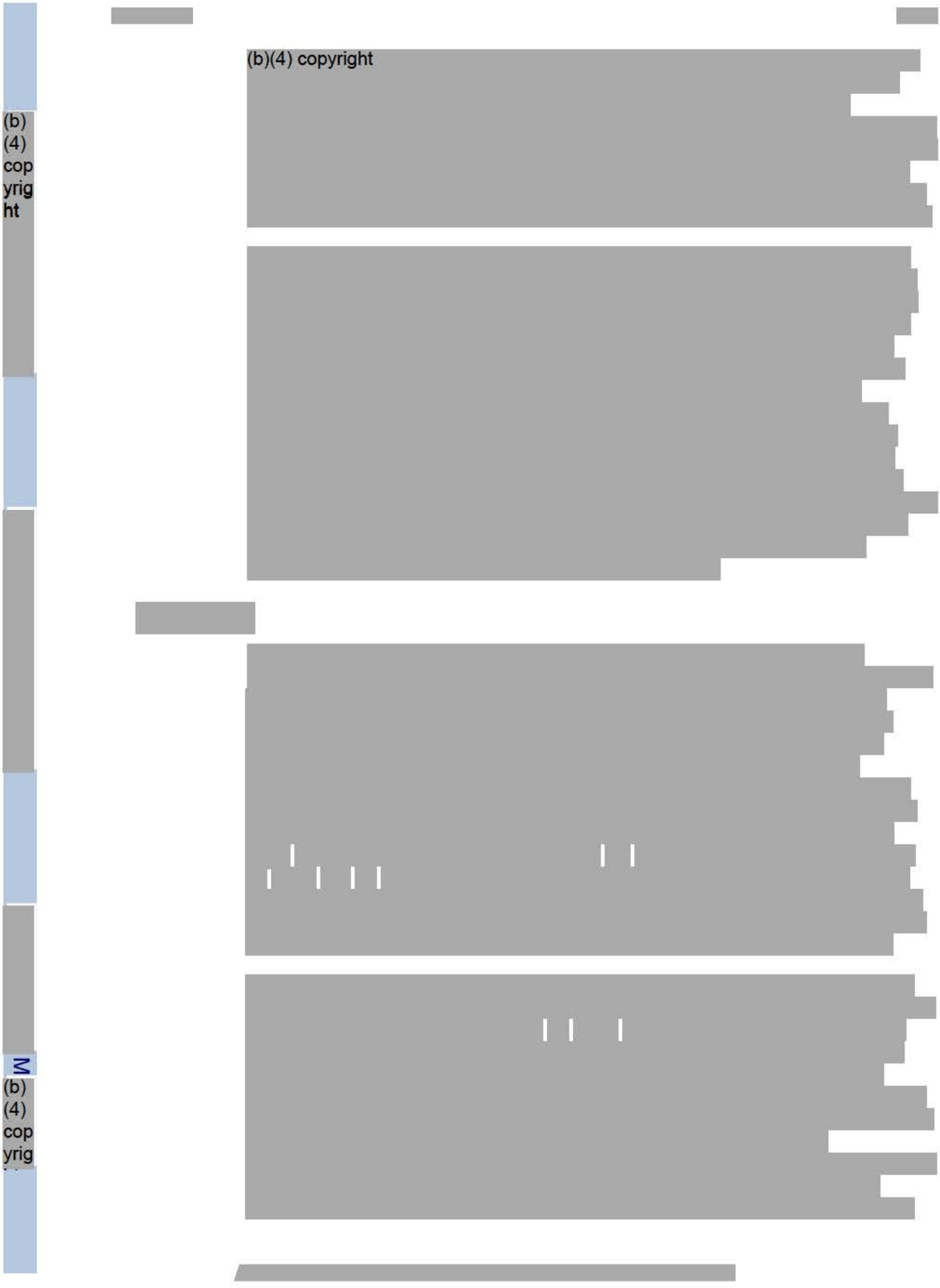
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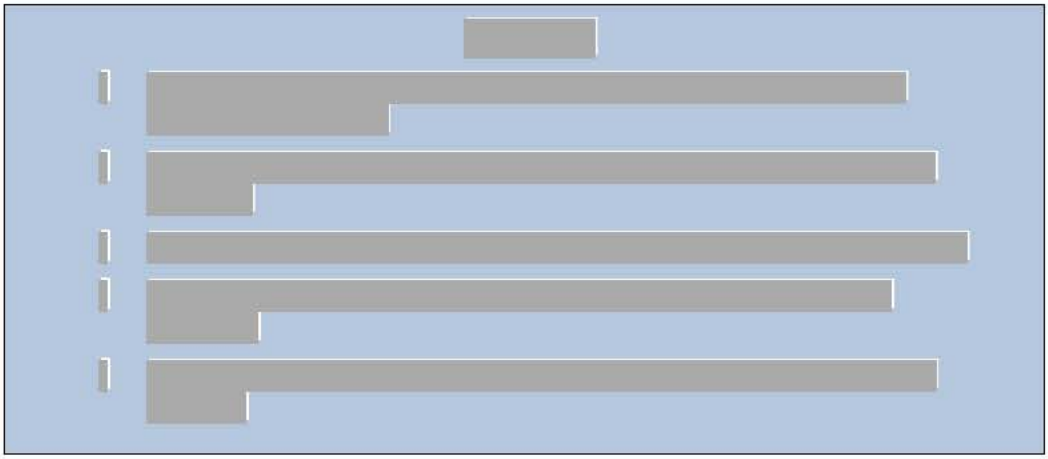

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ATTACHMENT G

Proposed changes to Portland Harbor Superfund

Oregon State University

Background

The Oregon State University Superfund Research Program studies polycyclic aromatic hydrocarbons at Superfund sites. We prepared this fact sheet to clarify the proposed changes to Portland Harbor.

The United States Environmental Protection Agency (EPA) evaluates the toxicity of chemicals through a standard process. In January of 2017, based on current research, benzo[a]pyrene (BaP) was updated and is now considered to be 7 times less toxic for humans through ingestion and skin contact than previously thought. For Portland Harbor, the risk assessment considered risk for both adults and children. The new value is considered protective of human health.

What is Benzo[a]pyrene?

BaP is a polycyclic aromatic hydrocarbon (PAH). PAHs are pollutants found in the air, water, soil and food. The primary source of PAHs is from burning carbon-containing compounds, such as wood, petroleum and fuel. They are also found in gasoline and diesel exhaust, soot and cigar / cigarette smoke.

BaP is a carcinogen. This means that continued, high exposure increases cancer risk. The EPA update also includes a non-cancer risk factor.

What does this mean?

The change in benzo[a]pyrene toxicity may impact the planned clean-up of the Portland Harbor Superfund site. In addition to changing the toxicity of BaP, the change will affect six additional carcinogenic PAHs, for a total of 7 PAH toxicity values changed.

BaP is used as a standard for 6 other carcinogenic PAHs.

How it works: BaP is assigned a factor of 1. The other 6 PAHs are assigned a value relative to BaP. This value shows if they are considered more or less carcinogenic than BaP. This graph shows the relative potency of these 7 PAHs at current levels (dark blue bars), and at the proposed new levels (light blue bars)

OSU Research on BaP and potency factors

Mechanism-based classification of PAH mixtures to predict carcinogenic potential. By S. Tilton et. al. 2015. *Toxicological Sciences* 146(1): 135-145. Results indicate that using BaP to evaluate carcinogenicity of other PAHs is insufficient.

Polycyclic aromatic hydrocarbons as skin carcinogens: Comparison of benzo[a]pyrene, dibenzo[*def,p*]chrysene and three environmental mixtures in the FVB/N mouse. By L. Siddens et al. 2012. *Toxicology and Applied Pharmacology*. 264(3): 377-386. This study showed that the carcinogenicity of DBC and two of the mixtures was greater than would have been predicted using published Relative Potency Factors.

Want the papers? *Contact us*: diana.rohlman@oregonstate.edu

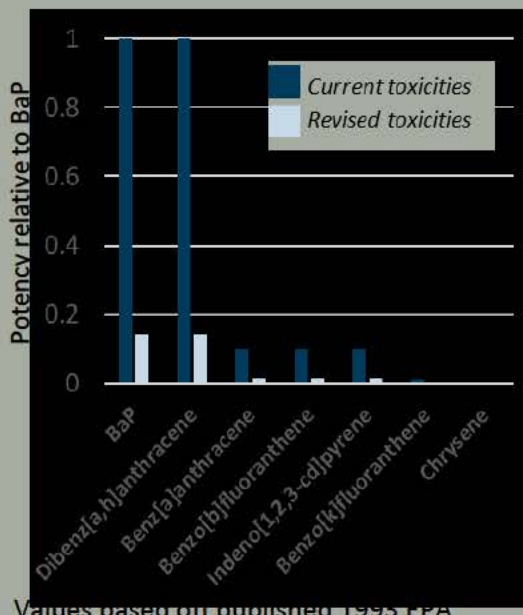
What changes?

- ~$35 million saved
- ~17 fewer acres remediated
- Reduced toxicity values for 7 carcinogenic PAHs
- Other PAHs unchanged

PAHs can be man-made and can occur naturally.

Common Sources of PAHs

Old vs New toxicity values



Values based on published 1993 EPA document: https://www.epa.gov/sites/production/files/2015-11/documents/pah-rpfs.pdf.